

Proposal

A Mindfulness Based Intervention to Support Student Self-Regulation

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Abstract

Student differences in executive functioning can create unequal access to learning and engagement in elementary classrooms. This Action Research Project, conducted in a fourth-grade classroom of sixteen students, investigated whether a Mindfulness-Based Intervention (MBI) would have an effect on student executive functioning. I hypothesized that explicit socio-emotional teaching, paired with daily mindfulness practices, would help students build a toolbox of self-regulation strategies and grow in mindfulness. The intervention used two subscription-based programs, Second Step and Mindful Music Moments, although it is replicable without a subscription to either. Students completed pre- and post-intervention measures, including an executive functioning skills rubric, the Five Facet Mindfulness Questionnaire-15, and reflective surveys. In summary, this project found that explicitly teaching mindfulness, self-regulation, and social-emotional skills changed how my students handled real situations. Students transferred these strategies on their own, in and out of the classroom, and grew most in their ability to pause and respond thoughtfully rather than react. Although this intervention did not see gains in all facets of executive functioning, the findings suggest that explicit, embedded strategy practice can meaningfully support elementary students' self-regulation.

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Introduction

This Action Research Project is implemented within a fourth grade classroom at the Ray School in Hanover, NH, a K-5 public elementary school with around 450 students. Most students remain with the same teacher in the same classroom for nearly the entire day. Students leave the room only for a "specials" block, recess, and a twice-weekly Spanish class. Otherwise, my class of sixteen moves through every subject, transition, and unstructured moment of the day together. This means that students rarely have natural transitions or breaks from the classroom between academic blocks. This was my first year of teaching, and I came into the role curious about how I might incorporate natural and effective breaks into our routine to chunk learning for my homeroom students.

Executive functioning, the cognitive processes that support planning, attention, working memory, and flexible thinking, continues to develop into adolescence, and children of the same age can vary widely in how efficiently these skills operate (Loher & Roebbers, 2013). Executive functioning is also malleable, leading me to wonder whether I might be able to bring my own practice of mindfulness to my students as a tool for self-regulation.

Mindfulness is the practice of paying attention to the present moment without judgment (Ritter & Alvarez, 2020), and a mindfulness-based intervention (MBI) is a structured program that works to achieve a goal such as executive functioning or self-regulation. I began teaching about mindfulness in connection to body systems, bringing student awareness to how their digestive, respiratory, and nervous systems sustain them. Through my Action Research Project, I explore whether practicing mindfulness actually had an effect on executive functioning— more specifically, self-regulation. Therefore, this design is useful for elementary school educators who

are interested in explicitly teaching mindfulness and socio-emotional skills in order to help their students manage the complex demands of a school day.

Problem of Practice

My students vary widely in how they manage their time, attention, and transitions. Some can start and complete tasks with little help, while others become distracted or feel overwhelmed when routines change or directions have several steps. These patterns reflect how my students are able to self-regulate in the classroom. However, success with self-regulation is not about effort or motivation. It is driven by students' executive functioning: the mental processes that support planning, attention, working memory, and flexible thinking (Spiegel et al., 2021). I observe self-regulation through behaviors, but what I am actually seeing are differences in executive functioning skills which play a crucial role in how students access learning.

The problem of practice I aim to address is that student differences in executive functioning create unequal access to learning, engagement, and instructional time in my fourth-grade classroom. Although I implement Tier 1 supports for organization, attention, and self-regulation, they are not consistently effective for the class or sufficient for students who need individualized help to stay focused and transition between tasks. To support these students, I provide a disproportionate level of individualized attention such as writing To-Do lists on desks, setting and re-setting timers for student breaks, and trying to work one-on-one with multiple students at a time to support their attention on the task. Although helpful for these students, it pulls attention from the rest of the class and ironically perpetuates inequity. I plan to design a research-backed intervention to establish stronger classroom-wide support for executive functioning skills.

There are a few factors correlated with how I see my students vary in terms of self-regulation. We spend the vast majority of the day (including lunch) in the same classroom with few natural breaks, and students do not always get the physical or mental reset they need between subjects. I also notice that students have trouble attending for longer than 10 minute intervals, but class blocks run for an hour or more and often expect sustained student attention on the same task for 15-30 minute blocks.

The effect of my PoP is that students who struggle with attention or working memory experience higher stress, ask for repeated directions, or delay transitions for a longer break. Others get distracted while waiting for the class to settle. Additionally, students get angry with each other if the whole class is not ready on time, creating a negative atmosphere to begin lessons or walk in the hallway. Research shows that when the demands of executive functioning outpace students' development, learning becomes inconsistent and stressful for everyone (Spiegel et al., 2021).

This problem shows up every day. During transitions, self-directed work periods with a "menu" format, or anytime there is not a natural break after 10 minutes of work, students struggle to focus, while others lose patience or disengage. The effects on pacing, stress, and learning time are immediate and visible, which makes this a pressing issue to address right now. The problem feels urgent because it affects both learning and well-being. Students who need frequent redirection often feel frustrated or embarrassed by a constant adult presence at their work station. Over time, this dynamic can widen gaps in confidence and participation. It might also create executive functioning reliance on an adult, as I notice one student who usually does not self-regulate or follow the classroom routine until he is explicitly told and helped to do so. My problem of practice is also relevant because it connects to larger educational goals around

equity, inclusion, and social-emotional learning. Executive functioning has been shown to influence academic outcomes in reading, language, and math (Spiegel et al., 2021). Finally, this problem is focused enough for a classroom-level study. I plan to look specifically at how explicit instruction, mindful music moments, and structured breaks affect student attention, transitions, and engagement. These are behaviors I can observe and measure through reflections, simple data collection, and student feedback.

Noticing the trends leading to my PoP led me to realize that not all of my current routines and visual supports meet the range of needs in my classroom. I also noticed, however, that certain routines do really work for all students. One of those routines is incorporating a mindful music exercise into “quiet time” after lunch. Studies on mindfulness in schools suggest that short, guided moments of stillness or focused breathing can strengthen executive functioning and reduce stress (Ritter & Alvarez, 2020). Music can also support attention and mood regulation, especially when it is calm and rhythmic (Lawrence, 2001). These findings align with what I hope to test through short mindful music moments and structured brain-body breaks.

Literature Review

Introduction

Everyday routines in a fourth-grade classroom require students to sustain effort, complete tasks, and maintain attention despite frequent distractions and competing demands. A student's ability to manage these expectations relies heavily on their executive functioning skills, which vary widely among children of the same age. These skills are often invisible when they are functioning well, but they become apparent when students struggle.

My problem of practice states that differences in students' executive functioning create unequal access to learning, engagement, and instructional time in my fourth-grade classroom.

This is a pressing concern because executive functioning skills shape students' abilities to remain engaged in instruction and because differences in regulation often result in lost instructional time for the class as a whole. When students struggle to sustain attention or regulate behavior, teachers must redirect instruction, which can disrupt learning and limit access to academic content for all students.

In this literature review, I provide context on executive functioning as a foundational component of learning before examining how the literature explains my current problematic practice. I then review research that supports my desired practice, with attention to classroom-wide instructional approaches that promote executive functioning, self-regulation, and more equal access to learning.

What is Executive Functioning?

Executive functioning (EF) is a foundational mechanism through which students access instruction, regulate attention, and engage in academic learning. For example, in order to complete an assigned task, a student must remember the teacher's instructions and past material while thinking creatively *and* maintaining attention despite classroom noise and surrounding disturbances. Abilities such as these are frequently classified as executive functions: higher-order cognitive processes that allow individuals to control behavior and emotions in the service of goals (Anderson, 2008; Zelazo & Carlson, 2012).

One of the first understandings of executive functioning came from a famous case in the 1800s. A man named Phineas Gage suffered brain damage from a railroad rod piercing through his brain's frontal lobe. After his injury healed, he returned to work and retained his basic cognitive functions, although employers and family members noticed his failures to make wise judgments, cognitive inflexibility, poor planning of future actions, and difficulty inhibiting

inappropriate responses (Harlow, 1993). He was fired from his job and lost touch with family and friends, but his case is remembered and studied as one of the first connections scientists made between regions of the brain and function (Zelazo et al., 2008). What makes this case especially notable is that Phineas Gage lived locally in the Upper Valley, making him a memorable case to share with students when teaching about executive functioning.

Loher & Roebers (2013) sourced the literature to define the three main structural components of EF in adults: switching, inhibition, and working memory. Switching describes the ability to respond to changes in the environment by flexibly adapting to the according current demands. Inhibition denotes processes which are involved in the suppression of processing irrelevant yet dominant or prepotent stimuli or responses. Working memory is defined as the ability to store and mentally manipulate memory contents (2013). An example of these three components in action in my classroom is a student who is able to follow multi-step instructions for a task before completing the task together with a group. When working, they would take turns answering questions and writing answers, and they would be able to stay focused despite other groups or group members being distracting or loud. “Together, these various abilities allow for conscious, goal-directed problem solving” (Zelazo et al., 2008, p. 553).

EF as Predictive of Behavioral and Academic Skills

Executive functioning also underlies students’ ability to sustain attention during classroom learning. Loher and Roebers (2013) explain that sustained attention relies on multiple executive processes. To remain focused, students must keep task goals in mind, ignore distractions, and regulate competing stimuli. As the authors note, what is often referred to as sustained attention “comprises a variety of additional cognitive capacities along with pure attentional abilities” (p. 51), many of which are classified as components of executive

functioning. In everyday classroom contexts, these executive processes help students engage in goal-directed behaviors such as completing assignments, interacting with peers, and managing their own behavior. As Cumming et al. (2023) explain, students rely on executive functioning to serve as the brain's "air traffic controller," coordinating multiple cognitive demands so that behavior remains organized and purposeful (p. 177). As outlined below in the table, a child's academic and behavioral performance at school may be influenced by EF dysfunction. One example is how a student with the EF strength of inhibitory control will wait their turn to speak, but with EF dysfunction in working memory might have difficulty reading and remembering.

Table 1. *EF Process Definitions and Possible EF Strength or Dysfunction Characteristics*

Table 1 Executive Function (EF) Process Definitions and Possible EF Strength or Dysfunction Characteristics

EF process	Definition	EF strength		EF dysfunction	
		Academic	Behavioral	Academic	Behavioral
 Inhibitory control	Deliberate suppressing of attention or withholding an impulse	Able to ignore a humming peer in class and pay attention to the teacher's presentation	Able to wait their turn to speak during a class discussion	Has difficulty ignoring class distractions when completing an in-class writing assignment	Has difficulty controlling impulses, such as shoving a peer during game
 Working memory	Actively storing, maintaining, and manipulating information	Able to remember and use formulas to solve a math problem	Able to remember and use strategies to solve a social problem	Has trouble recalling sentences in a paragraph to comprehend content	Has challenges with remembering and following classroom rules (e.g., raising hand to speak)
 Cognitive flexibility	Adapting to changing demands or contexts	Able to easily switch from completing an independent writing assignment to participating in small group work	Able to think about a friend's perspective when in a conflict	Has difficulty identifying mistakes and fixing them in an assignment	Has trouble thinking of and using other options (e.g., fighting) when in conflict

Note. Icons from I Control curriculum. Copyright 2014 by Cognitive-Behavioral Research Group in Education University of Florida. Reprinted with permission.

Note. From Cumming et al. (2023).

Executive functioning consistently predicts academic outcomes across content areas. A meta-analysis conducted by Spiegel et al. (2021) synthesized findings from 305 studies representing more than 64,000 elementary school-aged children. Their results showed that relations between executive functioning and academic outcomes remained significant throughout elementary school, with working memory demonstrating moderate and consistent associations

with reading, mathematics, and oral language achievement. Cumming et al. (2023) also describe executive functioning as foundational to students' academic competence, noting that EF predicts school readiness and academic achievement (as well as behavior). More specifically, poor EF is associated with difficulties in reading (Christopher et al., 2012a), mathematics (Andersson, 2008; Bull & Scerif, 2001), and language (Lonigan et al., 2017), and it is longitudinally predictive of academic difficulties and school dropout (Duncan et al., 2007). Spiegel et al. summarize the strength of this relationship: "Across studies, concurrent and longitudinal associations between executive functioning and academic outcomes have been demonstrated" (p. 566). These findings indicate that strong executive functioning can be crucial for academic success.

Zelazo and Carlson (2020) similarly argue that executive functioning provides the foundation for many higher-order skills that support learning and behavior. For example, EF enables self-regulation, or the ability to intentionally monitor and adjust one's thoughts, emotions, and actions in pursuit of goals. Cumming et al. (2023) describe self-regulation as the effortful process of managing and adapting behavior, such as when a student monitors their progress on a writing assignment or regulates emotional reactions during peer interactions. Because executive functioning underlies these self-regulatory processes, students with weaker EF skills may experience greater challenges in both academic and behavioral contexts. Looking forward to an intervention on this topic, Zelazo and Carlson's research also suggests that EF skills can be cultivated through training, especially when interventions mitigate bottom-up influences such as stress, train both hot (more emotional) and cool (more cognitive) EF skills, and include a reflective, metacognitive component to promote far transfer of trained skills.

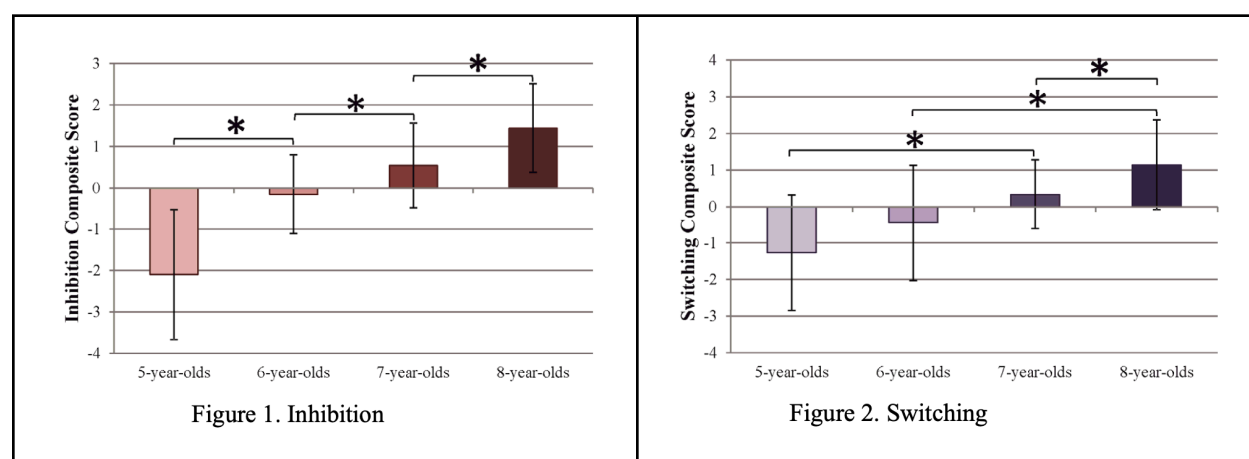
Differences and Development of EF

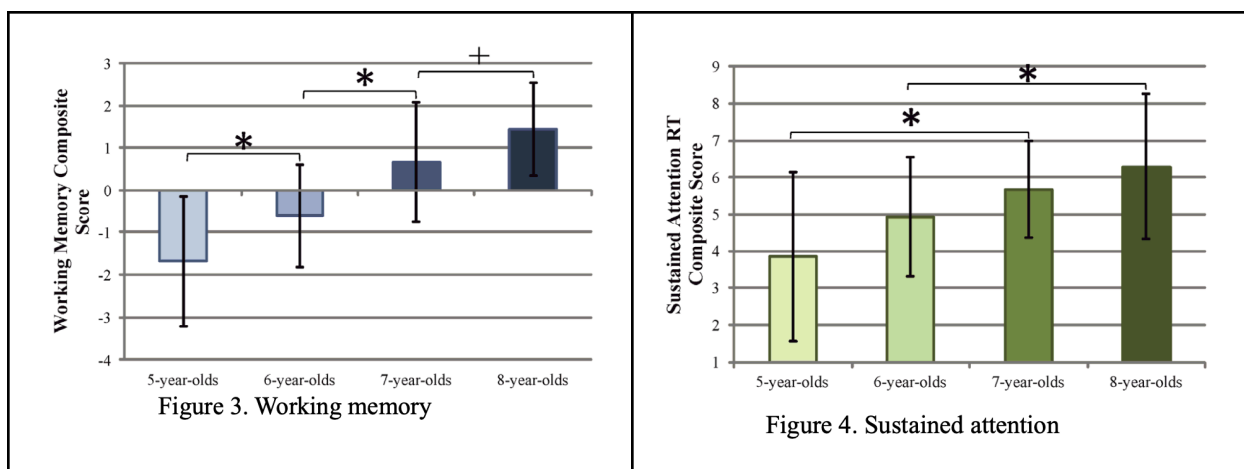
Differences in executive functioning reflect developmental variation and differences in experience and instructional support, rather than student motivation or effort. Executive functioning develops along trajectories, and children of the same age may demonstrate wide variability in their regulatory skills. Spiegel et al. (2021) emphasize the importance of specific executive functioning components changing over time. As students gain experience, academic tasks become more familiar and consequently less cognitively demanding.

Figure 1 depicts four findings of Loher & Roebbers (2013). Their study analyzed the developmental trajectories of five to eight-year-olds across the three components of executive functioning previously identified. As shown in the graphs, years of age are correlated with increases in scores for every component. Loher & Roebbers clarify that “no indication of ceiling performance in either age group suggests ongoing developmental progression” (pg. 60), which would include the nine to ten-year-olds in my fourth-grade classroom.

Figure 1

Executive Functioning Developmental Trajectories





Note. Adapted from Loher & Roebbers (2013).

Understanding executive functioning differences as developmentally and contextually driven provides an important lens for examining current classroom practices. This perspective shifts attention away from student effort alone and toward instructional structures that can either support or strain students' regulatory capacity. However, classroom engagement and climate are affected when some students struggle to regulate attention, hence my problem of practice.

As students' experience with academic tasks increases, the cognitive demands imposed by those tasks decrease, and executive functioning skills become more efficient. This developmental perspective challenges deficit-based interpretations of student behavior and supports viewing executive functioning as malleable.

EF as Malleable

Rather than remaining stable throughout development, executive functioning demonstrates plasticity, particularly during childhood, when cognitive systems are still undergoing development. Research suggests that executive functioning skills can be strengthened through experience and classroom-based instruction, rather than remaining fixed traits (Baggetta & Alexander, 2016; Ritter & Alvarez, 2020). This perspective is especially important for

teachers, as instructional design and learning experiences shape students' opportunities to practice their regulation skills.

Baggetta and Alexander (2016) synthesize a growing body of research demonstrating that executive functioning skills can be modified by experience and that improvements generalize to academic domains such as reading and mathematics. They note that these gains have been observed in classroom settings under relatively modest training conditions. As they explain, “recent research indicates that domain-general skills can be modified by experience, that these experience-based improvements generalize to academic domains, and that these changes occur in classroom settings under relatively modest training conditions” (p. 26).

Evidence of executive functioning plasticity is particularly strong in research focused on working memory. For example, Holmes et al. (2009) found that working memory ability in school-age children improved following adaptive computerized training administered in school settings for approximately 35 minutes per day over a period of five to seven weeks. This suggests that relatively short, structured interventions can support growth in core executive functioning skills.

Executive functioning can also be strengthened in students with identified learning and attention differences. Baggetta and Alexander (2016) highlight studies demonstrating plasticity in atypical populations, including students with attention deficit hyperactivity disorder. For instance, they cited research in which working memory training studies involving children with ADHD have shown improvements in response inhibition, reasoning, parent-reported inattentive symptoms, and even IQ scores following structured intervention. These findings support the idea that targeted experiences can meaningfully influence regulatory development.

Understanding executive functioning as malleable reinforces the importance of instructional context. If executive functioning skills can be strengthened through practice, then classroom routines, instructional support, and opportunities for regulation become critical for increasing students' access to learning. This perspective supports moving beyond individual accommodations toward classroom-wide practices that intentionally support executive functioning development.

Current Practice

Time Spent in Elementary Classrooms

Current practices in elementary schools often prioritize maximizing instructional time, particularly in core academic areas such as reading and mathematics. School schedules are typically designed around allocated minutes for instruction, with the assumption that increased exposure to academic content will lead to improved outcomes. However, research suggests that time allocation alone does not ensure student engagement and may unintentionally overwhelm students with an increase in cognitive demands.

Rosenshine's (2015) analysis of the *Beginning Teacher Evaluation Study* (BTES) illustrates how instructional time is distributed in elementary classrooms. The BTES was conducted between 1972 and 1978 in California, and it was a major research project aimed at identifying specific teacher behaviors which improve student learning. Across second- and fifth-grade classrooms, approximately 60 percent of the school day was devoted to academic instruction, while 23 percent was allocated to nonacademic instruction and 17 percent to noninstructional activities such as transitions and classroom management.

In many classrooms, including my own, instructional schedules reflect this emphasis on maximizing time in academic blocks. At the Ray School, students remain with the same teacher

in the same classroom for most of the day, leaving only for a “specials” block, recess period, and a twice-weekly Spanish class. This year, two shorter recesses were replaced with one longer morning recess, resulting in extended periods of uninterrupted academic instruction in the afternoon. While this schedule is intended to protect instructional time, it also requires students to sustain attention and regulate behavior for long periods without changes in setting.

Table 2. *Engaged Minutes in Grades 2 and 5*

Daily engaged minutes in reading and math

	Grade 2			Grade 5		
	Total Engaged minutes	Engagement rate	Percent of in-class time	Total engaged minutes	Engagement rate	Percent of in-class time
High 3	1'55"	82%	50%	2'30"	82%	53%
Average	1'30"	71%	39%	1'55"	79%	40%
Low 3	1'05"	72%	28%	1'20"	69%	28%

Note. From Rosenshine (2015).

As seen in the table above, "average" performing classes were actively engaged in academic work for only about 40 percent of in-class time, with fifth graders averaging just under two hours of engaged academic activity per day. Something to note is that the most efficient teachers (referred to as the “high teachers” in this report) were about 30 minutes above this; the low teachers were about 30 minutes below. Rosenshine points out that on one hand, the difference between the average and the best practice is no larger than 35 minutes per day, but “35 minutes a day comes to 105 hours” more of engaged time per year (p. 42). Oliver et al. (2011) suggest that good classroom management increases engaged learning time by decreasing disruptive behaviors that often result from poor executive functioning, because "attempts to control disruptive behaviors cost considerable teacher time at the expense of academic instruction" (p. 6). Similarly, Little and Akin-Little (2008) note that when teachers frequently redirect behavior during instructional periods, they are fragmenting learning time and shifting

attention away from instruction. The findings above, combined with my own observation, indicate that time alone is an insufficient metric for student learning and teacher effectiveness.

Executive Functioning Load and Classroom Stress

When students are expected to sustain attention for extended periods, executive functioning demands may exceed students' developmental capacity. EF skills, including working memory, inhibition, and cognitive flexibility, are still developing, and students vary widely in their ability to meet these demands. Spiegel et al. (2021) explain that although higher-order academic tasks consistently draw on executive functioning, "the cognitive demands imposed decrease with age and experience" (p. 4). When instructional expectations remain high without sufficient support, students who have not yet developed efficient regulatory strategies may struggle to access learning.

Rosenshine's (2015) findings provide an example of this mismatch. Extended academic blocks are common in elementary classrooms, but students are engaged for less than half of that time. When students are expected to remain focused for long periods without breaks, executive functioning demands build. In my classroom, this pattern is most visible during the extended academic period in the afternoon. After sustained periods of work, some students disengage quietly, while others become physically restless or express frustration. One student described this experience by saying, "I feel like I'm fizzing and vibrating inside, but I'm also too tired, and I just need to leave the room." This reflects a predictable reaction to prolonged self-regulation rather than a lack of motivation.

When executive functioning demands exceed capacity, learning becomes inconsistent and stressful (Spiegel et al., 2021). Zenner et al. (2014) concur that elementary students frequently experience stress, and that chronic stress affects brain structures involved in cognition and

mental health. This shows that sustained cognitive and behavioral demands may place students in a heightened state of stress, further reducing their capacity to regulate attention, behavior, and emotion.

Finally, Burns et al. (2021) show how disruption undermines class success, with "students and teachers consistently identify[ing] student disruption as a barrier to quality teaching and student learning" (p. 6). When some students struggle to regulate, disruptions increase, reducing instructional quality and learning time for the class as a whole. Over time, these patterns contribute to unequal learning experiences within the classroom (my problem of practice). Students who are able to self-regulate may experience frequent interruptions to their learning, while students who struggle with executive functioning may be repeatedly redirected or removed from instruction. However, "extant research has demonstrated that students academically benefit when they perceive their teacher as implementing need-supportive practices and working to meet student needs" (Burns et al., 2021, p. 5).

Classroom Management as a Primary Response

Much of the existing literature addressing classroom disruption and disengagement focuses on classroom management as the primary response. Classroom management is broadly defined as the practices teachers use to establish and maintain environments that support learning and appropriate behavior (Evertson & Weinstein, 2006). Research suggests that effective classroom management can reduce disruptive behavior and increase engaged learning time (Oliver et al., 2011). However, many commonly used management strategies emphasize responding to behavior after it occurs rather than addressing the underlying regulatory demands placed on students.

A study by Little and Akin-Little (2008) asked 149 teachers about their current teacher classroom management practices. They found that teachers frequently rely on verbal reprimands and redirection as primary management tools. While these strategies may temporarily suppress disruptive behavior, they do not necessarily support the development of executive functioning skills. Instead, they often take from instructional time with repeated interruptions (Oliver et al., 2011); Burns et al., 2021). In summary, these approaches may be effective in addressing problems temporarily, but they don't resolve underlying issues.

The literature suggests that current classroom practices often prioritize managing behavior and protecting academic time without enough attention to students' EF capacity. Teachers consistently identify classroom management as a major challenge, particularly in the first few years (Little & Akin-Little, 2008). As a first year teacher, my desired practice will include curating norms for classroom management that meet my students' executive functioning needs.

Desired Practice

Given the role executive functioning plays in all students' behavioral and academic functioning, supporting EF classroom-wide is key to increasing instructional effectiveness while decreasing student stress and disruptive behavior. Desired practice involves adapting classroom management to be less reactive and more proactive by developing EF skills and planning intentional breaks. Diamond (2013) emphasizes that

Because executive functions (EFs) are critical for academic achievement, a society that wants its students to excel needs to take seriously that the different parts of the human being are fundamentally interrelated. If emotional, social, or physical needs are ignored, those unmet needs will work against good EFs. (p. 156)

Emotionally Supportive Classroom Environments

Classroom climate is crucial in supporting executive functioning development, with emotionally supportive classrooms positively associated with student executive functioning growth over time. Diamond (2013) notes that "EFs and the prefrontal cortex are the first to suffer and suffer disproportionately if you are stressed, sad, [or] lonely" (p. 156). A positive classroom climate reflects warmth and connectedness through specific teacher behaviors. Cummings et al. (2023) explain that this can be seen in teachers who display positive affect such as smiling, use respectful communication, demonstrate active listening, and build relationships through social conversations and group activities. My school has adopted Responsive Classroom, an approach developed by Center for Responsive Schools, Inc., whose practices teach SEL competencies through morning meetings, logical consequences, rule creation, interactive modeling, and positive teacher language. Responsive Classroom practices are an example of how schools might work towards emotionally supportive classroom environments, and morning meetings provide a time for this intervention to be implemented.

The ideal teacher also recognizes when and which students need breaks and adjusts pacing accordingly (Cumming et al., 2023). Teachers who are mindful of students struggling with EF make "instructional modifications to reduce the impact of weak skills" (Dawson & Guare, 2009, p. 12). This might look like using predictable routines, modifying tasks (e.g., making them shorter or more explicit, building in student-choice), and by modeling the way adults should interact with students (e.g., by providing prompts, reminders, and close supervision). These strategies may be most effective for students with weaker EF, but the same techniques can also be used for the whole class.

Although it may be current practice, effective classroom management should not mean that assisting or redirecting students in need detracts from other students. Creating an emotionally supportive classroom should help students with special academic and/or behavioral needs, but also enrich the learning experience of all students.

Mindfulness Practice for Regulatory and Executive Functioning Skills

Research demonstrates that mindfulness-based interventions (MBI) offer reliable and powerful support for executive functioning development. Mindfulness is defined as "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" (Kabat-Zinn, 1990, as cited in Ritter & Alvarez, 2020, p. 544). Zenner et al. (2014) further explain mindfulness as "the psychological capacity to stay willfully present with one's experiences, with a non-judgemental or accepting attitude, engendering a warm and friendly openness and curiosity" (p. 1). This practice addresses executive functioning in multiple ways.

Zelazo and Carlson (2020) explain why mindfulness is particularly well-suited for supporting executive functioning development.

Mindfulness combines aspects of cognitive training (e.g., reflection and adaptive practice of attention-regulation skills, such as sustaining attention for longer and longer) together with emotion regulation strategies (acceptance and reappraisal, psychological distancing) to deal with bottom-up influences, such as anger and stress, that can hijack our EF skills. (p. 284)

During mindfulness practice, students pay attention to a particular mental object, such as their breathing; notice but do not dwell on distracting thoughts or feelings; and gently return attention to the object of focus (Zelazo & Carlson, 2020); Cumming, 2023). The goal is to train attention to be more focused in the present yet also more reflective. This trains both attention

regulation and emotion regulation. Cumming further breaks mindfulness practice into three parts: attitude, attention, and intention. Students learn to develop an accepting *attitude* characterized by nonjudgment, trust, and patience. They build skills in focused *attention* to sustain and switch their attention when necessary. They develop abilities in conscious *intention*, where they learn how to self-regulate. Students do not necessarily need to be sitting still to be mindful; they could be still or active as long as they can focus their attention to their body sensations (e.g., stomach moving while breathing), thoughts, and emotions (e.g., sadness, anger) without judgment and in the present moment (Burke, 2010). Other techniques include body relaxation techniques, such as breathing in and out slowly, focusing on body sensations (e.g., tightness in shoulders), and yoga (Cumming et al., 2023)

The neurobiological effects of mindfulness support executive functioning development at the brain level. Xie et al. (2024) used brain imaging with 68 preschool children and found that brain complexity was reduced after mindfulness-based intervention, "indicating a more efficient neural processing mechanism after the intervention" (p. 1), with significant differences in relevant brain regions during cognitive shifting and working memory tasks. Ritter and Alvarez (2020) explain that mindfulness training can elicit structural changes in the brain, which "fosters enhanced resilience and more optimal brain function" (p. 544). These findings suggest that mindfulness practice changes how efficiently the brain processes executive functioning tasks, making regulation less effortful over time.

Multiple meta-analyses provide broad evidence for the effectiveness of mindfulness-based interventions in school settings. Zenner et al. (2014) conducted a systematic review examining 24 studies representing 1,348 students and 876 controls from grades 1 to 12, concluding that "mindfulness-based training in a school context has effects that are seen mostly

in the cognitive domain, but also in psychological measures of stress, coping, and resilience" (p. 16). This is useful to consider because a MBI could improve both cognitive performance and stress management.

Mindfulness practice may also impact EF skills indirectly. Zelazo et al. (2016) note that mindfulness practice reduces depressive symptoms in children and adolescents, "including rumination and intrusive thoughts" (p. 69). Reductions in anxiety and depressive symptoms improve executive functioning performance, given the interaction between bottom-up emotional influences and top-down cognitive control. This suggests a connection between well-being and students' levels of executive functioning.

Finally, the effectiveness of mindfulness may be enhanced when combined with other instructional approaches. Zelazo and Carlson (2020) note that "mindfulness practice has also been found to improve EF skills and may be particularly effective when combined with reflection training and EF skills training (Zelazo et al., 2018)" (p. 284). They explain that "the combination of paying attention in a goal-directed way while also contextualizing and consequently attenuating the impact of emotions and their consequences" gives students greater understanding of their own mental function and ability to regulate during emotionally charged situations (p. 284).

Vehicle for Change

The research establishes that executive functioning can be strengthened through classroom practices, with mindfulness-based interventions showing promising effects. However, moving from current practices toward practices that proactively support executive functioning development might require teachers to re-create routines. It would also be helpful to ensure that students understand the "why" before practicing mindfulness and self-regulatory skills, such as

through common language about executive functioning, their body systems, and self-regulation. To move toward these practices, classroom management approaches should focus on building a supportive environment before beginning mindfulness based intervention.

Building an Emotionally Supportive Classroom Climate

Teachers should build classrooms characterized by positive climate, teacher sensitivity, and regard for student perspectives (Cumming et al., 2023). To create a positive climate, teachers can display positive affect, use respectful communication, and engage in active listening (Cumming et al., 2023). Routines such as “Morning Meeting,” as part of *Responsive Classroom*, build this climate through student greetings, sharing, and collaborative activities that provide daily chances to address student needs and incorporate social skills practice.

Teacher sensitivity requires recognizing when executive functioning demands may overwhelm students' capacity and adjusting accordingly. Breaks should be planned strategically based on cognitive and behavioral demands rather than scheduled arbitrarily. For example, breaks should be expected during my afternoons when our schedule includes no natural transition or opportunity for students to leave the classroom. The timing and type of brain breaks also matter. Zelazo et al. (2016) note that aerobic exercise with cognitive engagement, such as "exergames," may have greater effects on executive functioning than less engaging forms of exercise (p. 68). Breaks may also include mindfulness interventions, because "mindfulness practices have been shown to aid in emotional regulation by reducing anxiety and strengthening students' emotional resilience" (Shelach Inbar et al., 2025, section 1.1).

Students benefit from systematic instruction in skills that support self-regulation and executive functioning. Dawson & Guare (2009) argue that teachers should directly teach EF skills. They suggest that an instructional sequence for teaching executive skills looks like this:

identify the skill deficit; set a goal; outline the steps to be followed to achieve the goal; turn the steps into a checklist; supervise the student, providing feedback along the way; evaluate and revise; and eventually phase out the supervision. This approach shows how executive functioning skills can be taught explicitly, but support can decrease over time and repetition.

Incorporating Mindfulness into Daily Routines

Research indicates that mindfulness is most effective when embedded into daily classroom routines rather than implemented sporadically. Several specific mindfulness programs have been evaluated with elementary-aged students, providing examples for dosage, delivery method, integration with existing curriculum, and expected outcomes.

Ritter and Alvarez (2020) evaluated the Mind Yeti program with 177 third, fourth, and fifth grade students in their natural classroom setting.*¹ "The Mind Yeti curriculum was chosen because it features several administrative components that have been lacking in previous studies: smaller dosage, led by classroom teachers, and delivered in a classroom setting" (p. 545). Students participated in six sessions per week for six weeks and self-reported their executive functions pre- and post-test. The study found that students significantly improved on three of the six EFs examined: working memory, cognitive flexibility, and inhibition. Additionally, "students in fifth grade responded better to Mind Yeti than students in third grade" (p. 544), suggesting that upper elementary students may be particularly well-positioned to benefit from mindfulness training. Following the intervention, fifth-grade students especially showed improvements in working memory and cognitive flexibility.

Ritter and Alvarez (2020) compared their findings with earlier research to understand which specific aspects of mindfulness practice produce which outcomes. They noted that "one

¹ The Mind Yeti platform on MindYeti.com shut down on November 13, 2022, and its guided mindfulness sessions have since been integrated into the digital Second Step Elementary program. This study directly influenced my choice to use Second Step programming within my intervention.

similarity between this study and that of Flook et al. is that they also found statistically significant improvements in the areas of Emotional Control...and Working Memory" (p. 550). However, they also found differences, noting that "this could have been due to methodological differences between the studies, especially in the types of mindfulness activities in which the students were engaged in" (p. 550). In Flook et al. 's intervention, students engaged in three different types of activities (sitting meditation, games and activities, and modified body scan or meditation) in each session, whereas Mind Yeti activities included imagination and following the breath. This suggests that the specific design of mindfulness activities (not just the general practice of mindfulness) shapes which aspects of executive functioning are most affected.

Flook et al. (2010) also provide evidence that mindfulness-based interventions are particularly effective for students who struggle most with executive functioning. In their randomized control study of 64 second- and third-grade children who received mindful awareness practices for 30 minutes twice per week for 8 weeks, teachers and parents completed questionnaires assessing children's executive function before and after the intervention. They found that "children in the MAPs group who were less well regulated showed greater improvement in EF compared with controls. Specifically, those children starting out with poor EF who went through the MAPs training showed gains in behavioral regulation, metacognition, and overall global executive control" (p. 71). This shows that mindfulness training appears to narrow the gap in executive functioning skills.

The study also noted that both teachers and parents reported changes in EF, suggesting that improvements in children's behavioral regulation generalized across settings (Flook et al. (2010), p. 71). When students learn regulation strategies through mindfulness practice in school, these skills will hopefully transfer to home and other contexts! Additionally, "the mindfulness

program, which had a substantial yoga component, improved children's selective attention on performance of a computer task, increased attention and social skills as reported by teachers, and reduced test anxiety according to children's self-report" (p. 73). This range of outcomes demonstrates the MBI's broad impact.

Amundsen et al. (2020) implemented a 6-week Living Mindfully Programme with 108 children aged 9 to 10, delivered by class teachers as part of their normal curriculum. Self-report measures of well-being, mindfulness and emotion regulation were collected pre- and post-training and at 3-month follow-up. "Immediately after training and follow up, when compared with the wait list control, children who received mindfulness training showed significant improvements in mindfulness, Positive Outlook, and Life Satisfaction" (p. 1). These effects remained even when compared to an active control, which means that the impact was due to mindfulness practice rather than simply attention or engagement. Furthermore, "a significant positive relationship was found between changes in mindfulness and changes in cognitive reappraisal" (p. 1), indicating that mindfulness practice also helped these students develop more sophisticated emotion regulation strategies (which support EF).

The structure and consistency of mindfulness practice influence outcomes. The studies reviewed so far demonstrate that brief but frequent practice can produce measurable improvements: six sessions per week for six weeks (Ritter & Alvarez, 2020), 30 minutes twice per week for 8 weeks (Flook et al., 2010), and 6 weeks of daily practice (Amundsen et al., 2020). However, Zelazo et al. (2016) note that "no studies to date have examined the duration of training-related gains or the transfer of gains to academic achievement" (p. 69), suggesting that ongoing practice may be needed to maintain benefits long term.

Shelach Inbar et al. (2025) provide evidence of sustained benefits by incorporating mindfulness into science content instruction. They studied 460 students aged 9-11 from six elementary schools. In the experimental group, science lessons included mindfulness activities such as introspective inquiry, mental training, and meditation focused on specific content of each class. "Students in the mindfulness group demonstrated significantly higher levels of mindfulness, motivation, and achievement in science compared to students in the control group, and the improvement was maintained 6 months later" (p. 1). This suggests that making mindfulness a part of the existing curriculum is the most successful way of carrying out a MBI so far.

Daily mindfulness practice for my intervention could start with an embedded science unit, and then transition to mindfulness and brain break exercises focused on bringing student awareness to their needs. Music-based mindfulness is an emerging approach. Lawrence (2001) notes that calm, rhythmic music at specific tempos supports different classroom goals: "50-60 b.p.m. for study, testing, workgroups, and computer time; 30-60 b.p.m. for settling the class after high energy activities" (p. 8). An organization called The Well promotes [Mindful Music Moments](#), a program intended to help students incorporate mindfulness into school daily with five minutes of music and guided reflection (Kessler, n.d.). The program just concluded its tenth year of operation, and has conducted research on impact and implementation each year. Over 180 educators completed their annual teacher survey, and the top three challenges facing students according to teachers: are 1. Self-regulation and social-emotional skills, 2. Attention, focus, and motivation to stay engaged, and 3. Unstable home environments. In the same survey, 76.4% of educators agree that Mindful Music Moments is an effective tool for teaching self-awareness and

self-management skills. Although the long-term impact of music mindfulness requires further study, these anecdotal reviews provide promising evidence of a resource to explore.

Using Reflection and Self-Assessment to Strengthen Executive Functioning

Students' understanding of their brain and stress response may support effective use of regulation strategies. When students understand why strategies work, they may become more invested in practice. Teachers can introduce basic concepts about executive functioning using tangible explanations, such as the historical case of Phineas Gage as referenced in the introduction. This helps students recognize that difficulties with regulation reflect malleable brain systems that can be strengthened.

Creating opportunities for reflection also builds metacognitive awareness. After practicing regulation strategies, teachers can ask students to assess: Did this strategy help you? How do you know? When might you use this again? This aligns with Zelazo and Carlson's (2020) emphasis on reflection as critical for executive functioning development, because "having paused, children are then in a position to exercise their EF skills (i.e., cognitive flexibility, working memory, and inhibitory control), often using self-directed speech as they do so" (p. 282). Self-assessment structures can help students track their progress and build their ability to recognize patterns in their own regulation.

Even very brief (15 minute) interventions targeting high-level skills like reflection and cognitive flexibility are effective, and the corresponding neural changes may reflect use-dependent myelination, dendritic thickening, and synaptic pruning (reduction of connections among neurons that are not used). The trained networks may become more efficient, so reflection and EF occur more automatically and more quickly, providing

more time for thoughtful reflection prior to overt action or decision making. (Zelazo et al., 2016, p. 67)

As the teacher provides strategies for practicing EF and regulatory skills such as aerobic brain breaks or mindful breathing, students can track which strategies work best for them in different situations. This process of reflection is intrinsically effective in increasing EF.

Conclusion

Through building an emotionally supportive classroom, teaching mindfulness as neurobiological support, and using reflection and self-assessment, teachers can directly improve student executive functioning. These practices explicitly and proactively build regulatory skills rather than relying on reactive behavior management.

Zelazo, an author who guided much of my research and thinking on the topic of executive function, summarizes that "intervention efficacy can be enhanced by mitigating disruptive bottom up influences such as stress, training EF skills, and adding a reflective, metacognitive component to promote far transfer of trained skills" (2020, p. 1). Looking towards my intervention, my hope is that explicit socio-emotional and mindfulness practices have the potential to narrow gaps in executive functioning and create more equitable access to learning for all students.

Theory of Action

Problem of Practice	Desired Practice	Understanding of Problem (from Literature and from your Practice)	Intervention Design	Expected Change
Student differences in executive functioning create unequal access to learning, engagement, and instructional time in my fourth-grade classroom.	I provide frequent and intentional "brain breaks" for the whole class. Students use a toolbox of	<u>Problem correlations:</u> - Students are in the same classroom with the same teacher all day = few transition breaks - My students tend to disengage after 10-15 minutes of the same task <u>Problem effects:</u> - Learning becomes inconsistent and	I will give students background knowledge about the nervous system, respiratory system, executive functioning, and self-regulation. I will practice strategies with students for	Students will be able to explain key terms (nervous system, respiratory system, EF, mindfulness and self-regulation) and relate terms to themselves.

My current classroom management gives a high level of attention to students struggling with EF and takes attention away from students ready to learn/ respectfully participate.	strategies to self-regulate. Students reflect to explain why strategies work for them.	stressful, especially for students struggling with EF (Spiegel et al., 2021) - Other students feel unhappy <u>Desired changes:</u> - Student metacognition about EF - All students share common language & strategy toolbox <u>Theory of implementation:</u> - Students understand the “why” before practicing mindfulness & self-regulatory skills, so that they feel invested in their own practice and can carry these skills outside the classroom.	self-regulation, communication, focus, and problem solving: - Breathing & brain break strategies - Alternate seating - Second Step activities I will facilitate appropriately timed breaks and exercises for the whole-class: - Active breaks (stretching, dancing, shaking out) - Fun breaks (going outside, playing a group game) - Mindful breaks (breathing exercise, quiet time, mindful music)	Students will use a toolbox of strategies to self-regulate, communicate, focus, and solve problems. Students are more mindful (measured across five domains: Observing, Describing, Acting with Awareness, Non-judgement, and Non-reactivity)
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Intervention Design

This intervention is a mindfulness-based intervention (MBI) designed to support students’ executive functioning and self-regulation. This intervention also involves teaching socio-emotional skills to strengthen the emotional climate of the classroom. Mindfulness-based interventions are most effective when woven into the school day (Ritter & Alvarez, 2020; Zelazo & Carlson, 2020), so the intervention builds intentionally on practices already present in the classroom. It will take place over approximately four months, from March until June. Mindfulness instruction will be introduced during Morning Meeting along with socio-emotional lessons about mindset, emotion-regulation, and kindness. My goal is for students to practice enough for regulation to come naturally during times of high cognitive, emotional, or social demand.

Students have already participated in a science mini-unit focused on the digestive, nervous, and respiratory systems. This pre-teaching is intended to provide students with a concrete understanding of how their bodies respond to stress and how physiological processes such as breathing and movement promote wellness. It allows mindfulness practice to be taught as

a useful regulatory strategy that builds on students' understanding of their own bodies. Students are also familiar with daily "Mindful Music Moments" from The Well during quiet time, but these practices have not yet included explicit instruction in mindfulness or executive functioning. The intervention will therefore shift an existing routine from a calming practice to an explicit regulatory strategy. During Morning Meeting, students will be introduced to shared language related to executive functioning, self-regulation, and mindfulness, supporting their ability to describe internal experiences and reflect on successes/challenges.

At the launch of the intervention, students will use a rubric to self-evaluate their EF skills along certain criteria (such as time management, organization, etc.) by circling "Not Yet, Almost, or Yes!" This is intended to collect baseline data and promote their awareness of strengths and areas for growth. Students will also personalize mindfulness journals, which will be used consistently throughout the intervention for reflection, self-assessment, and goal setting. These journals are intended to serve both as a tool for student engagement and as an artifact documenting changes in students' understanding and use of regulation strategies over time.

Explicit socio-emotional instruction will be introduced through structured lessons during Morning Meeting. The lessons are sourced from a popular program, *Second Step* (Committee for Children, n.d.), which I will be trialing for 30 days as part of this intervention (See Second Step in Appendix for more information). These lessons will address growth mindset, emotion management, empathy & kindness, and problem solving, and are intended to create a positive classroom climate. Instruction will be reinforced through 2-15 minute "brain breaks" throughout the school day, including breathing exercises, indoor movement breaks, outside time, read-aloud, quiet time, and music-based mindfulness. Examples could be anything from a rhythmic clapping/focus exercise ("I'm alive, awake, alert, enthusiastic") for two minutes to a five-minute

lying-down guided breathing exercise. Consistent with prior research, the intervention emphasizes practice integrated into routines rather than stand-alone lessons (Flook et al., 2010; Ritter & Alvarez, 2020).

Students will reflect daily through independent journaling and class discussion about how socio-emotional and mindfulness practices affect them in different contexts. Reflection is intended to strengthen metacognitive awareness by encouraging students to use strategies most suited to their own needs, a process central to EF development (Zelazo & Carlson, 2020). This Mindfulness-Based Intervention thus integrates explicit instruction, daily practice, and reflection within classroom routines. The sequence of the proposed intervention in the table below.

Sequence	Design Activity	Goal	Artifacts & Resources
Pre-teaching	Students learn about their digestive, nervous, and respiratory systems through a science unit, taught over six 45-minute class periods.	Students understand how their own body systems work & how to promote wellness (eg. breathing, stress, exercise, nutrition)	Body system lessons from Unit Plan made for UVEI TIP program
1. Establish Common Language	Explicit vocabulary instruction during Morning Meeting →	Students can use and understand key terms under three branches: 1. mindfulness (belly breathing, diaphragm, being present, etc.) 2. executive functioning (see terms under "criteria" on rubric) 3. Socio-emotional (growth mindset, emotional regulation, etc. during Affective Education)	

2. Data Collection	Students self-evaluate by filling in an EF rubric and the Five Facet Mindfulness Questionnaire - 15 (FFMQ-15) (Baer et al., 2012). They also complete a pre-assessment including open and closed questions within a google survey.	Pre-assessment	1. EF Skills self evaluation rubric 2. Five Facet Mindfulness Questionnaire - 15 (FFMQ-15). 3. Student-friendly scoring guide
3. Set Up Journals for Guided Reflection	Students personalize mini notebooks, discuss the importance of reflection.	Excitement, buy-in	Teacher goal presented to students Notebooks for journaling
4. Explicit Socio-emotional Instruction	Second Step instruction (30 minute lessons) through Morning Meeting (includes growth mindset, emotion management, empathy & kindness, problem solving)	Set up emotionally supportive classroom community	Digital Curriculum: see website (requires subscription to access).
5. Daily Mindfulness Practice	Variety of active/ body breaks, indoor and outdoor, breathing, walking, eating, music, being still	Students become more comfortable & engaged with mindfulness as they figure out what works best for them	Mindful Music Moments with The Well (requires subscription to access) Mind Yeti abridged free access on Youtube here (Mind Yeti, n.d.) Kindness 101

6. Share & Reflect	Ongoing daily reflection & sharing either in journals and vocally during morning meeting and closing circle Post-assessment using EF skills rubric & vocabulary google survey	Student feedback on mindset, EF, and regulation	Post-Assessment Google Form here Interview questions for recording here
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Research Methods

Participant Selection

This intervention will be conducted in my fourth-grade homeroom at the Ray School in Hanover, NH. This class is with me in our classroom every day, all day, excluding when they are at specials, recess, and Spanish. The class includes eleven girls and five boys. Five of my students have an IEP, two of which are for ADHD. This is relevant because those two students face more challenges with executive functioning as a result of their diagnoses.

Most students at the school have parents who are invested in their education. About one third of parents responded to the 2026 survey given by the SAU 70 school district, reporting that 53.86% of households have a doctorate or equivalent (SAU 70, 2026). This compares to the U.S. Bureau of Education Statistics data from 2026, where about 3.3 percent of Americans in 2026 have a doctorate or professional degree (Hanson, 2026). Over 50% of households who responded to the SAU 70 survey have an approximate income of over \$200,000, and 70% of the families are white. Within my class, fourteen of my sixteen students are white. 50% of survey respondents cited the quality of the school to be the main reason they live in the Hanover/Norwich area.

All students in my class have been exposed to mindfulness exercises throughout the school year. They have also had an introduction to topics such as growth mindset and emotional

regulation during Affective Education classes led by the school counselor. This MBI will adapt our current practices to be more intentional, as well as incorporate reflection following the practices. Overall, this small, classroom-based study is aimed at adapting my teaching to create more equal access to instruction by helping all students strengthen their executive functioning skills, especially self-regulation.

Baseline Data

Before the intervention, I will collect baseline data in two forms. Firstly, students will self-evaluate their EF skills on a rubric broken into criteria: time management, organization, task initiation, working memory, emotional regulation, goal setting, self-control. The Appendix contains the EF Skills Rubric Questionnaire, which has a three-point scale for "Not Yet," "Almost," and "Yes!" in regard to each criterion.

The second form of data will be collected using the Five Facet Mindfulness Questionnaire - 15 (FFMQ-15- see Appendix). This is a self-report scale that measures mindfulness with regard to thoughts, experiences, and actions in daily life (Christopher et al., 2012b). The FFMQ-15 measures 5 subscales of mindfulness: Observing, Describing, Acting with Awareness, Non-judgement, and Non-reactivity. The original FFMQ is 39 questions, but the 15-question version is more appropriate for fourth-graders and has been confirmed for reliability and validity in mental health service users (Wong et al., 2026).

Impact Data

Multiple data sources will determine whether the MBI impacts students' executive functioning and self-regulation. The data include student self-assessments, teacher observations, and open-ended student reflections in survey and interview format. I will analyze the data for the three Expected Changes outlined in my Theory of Action: students will explain key terms and

vocabulary (Expected Change 1), students will use a toolbox of strategies (Expected Change 2), and students will become more mindful (Expected Change 3).

After collecting baseline data, I will collect anecdotal data in my journal, looking for new trends or reactions to facets of my intervention such as whether students enjoyed certain types of music more than others. The Second Step lessons and worksheets themselves provide a mixture of roleplaying scenarios, discussion prompts, and written responses. I will observe students' conversations and roleplay, and I will use the Second Step provided rubrics to evaluate their work on performance tasks at the end of each unit. I will also use turned-in worksheets to evaluate student progress using my own teacher-created rubric.

Student journals will provide an additional source of impact data.*² Throughout the intervention, students will reflect on mindfulness practices, identify strategies they used, and describe how those strategies affected their focus, emotions, or behavior. I will analyze journal entries for evidence of metacognitive awareness, accurate use of executive functioning vocabulary, and connections between mindfulness strategies and self-regulation.

Finally, students will complete three post-intervention assessments. They will reassess themselves using the EF Rubric, the Five Facet Mindfulness Questionnaire - 15 (FFMQ-15), and they will complete a reflective Google Form. See the Appendix for the Post-Assessment Google Form (Data A4). Comparing pre- and post-responses will help determine whether students improved in regulatory behaviors, and/ or developed a more sophisticated understanding of executive functioning and mindfulness. Because reflection itself is useful for strengthening EF (Zelazo, 2015), the act of self-evaluation is also an important part of the intervention.

²Although a valuable part of implementation, these journals did not end up being used as a data source due to student privacy reasons. See Additional Findings and Unexpected Outcomes for further discussion.

Impact Data Sources

Expected Change	Data Sources (2–3 source)	How will these data sources help me assess the expected change? (Indicators)
Students will be able to explain key terms related to executive functioning and mindfulness and relate terms to themselves.	Participant journals Student interview Post-assessment Google Form Second Step student worksheets and activities	Students will use key terms in their journal, class reflections, and interview Students will connect what they learn about mindfulness to what they know about body systems in their post-assessment
Students will use a toolbox of strategies to self-regulate, communicate, focus, and solve problems.	Observation Participant journals Post-assessment Google Form EF Rubric pre and post assessment Second Step student worksheets and activities	Students know how to solve problems and identify their emotions. Students will raise hands rather than shouting out. The class will be able to transition quickly. Students will enjoy and be able to complete group exercises such as a ball toss game. Students will know which independent mindfulness strategies work best for them. Students will report feeling happy and relaxed in class.
Students are more mindful (measured across five domains: Observing, Describing, Acting with Awareness, Non-judgement, and Non-reactivity)	Five Facet Mindfulness Questionnaire - 15 (FFMQ-15) Student interviews Post-assessment Google Form	Student self-report scores increase from the pre to the post test. Students feel that mindfulness exercises help them in class.

Implementation Data

I will collect implementation data to ensure that my MBI stays consistent and aligned with my goals. I am looking to answer two main design questions: (1) How does the teacher engage students with mindfulness and regulatory strategies? (2) How does the teacher engage students with socio-emotional learning? I will do this by using multiple data sources as outlined in the table below.

Throughout the intervention, observing which practices generate the most participation or positive reception will help me refine the design. I will use my own mindfulness journal to keep a personal log documenting student response to different types of mindfulness practices implemented. However, I will rely primarily on the post-assessment Google Form and interview data to inform me how the intervention was *received* by students. These data will inform whether my intentions were made clear and actualized.

Implementation Data Sources

Design Question	Data Sources	How will these data sources help me improve my design?
How does the teacher engage students with mindfulness and regulatory strategies?	Researcher Journal Observation Post-assessment Google Form	These sources will help me alter or refine my mindfulness instruction to be more effective by showing what is most effective to students - timing of brain breaks, type of mindfulness (breathing, active, quiet, independent, group), and length of time given.
How does the teacher engage students with socio-emotional learning?	Researcher Journal Second Step worksheets and activities Student Interview Post-assessment Google Form	These sources will inform whether my explicit instruction of socio-emotional skills and vocabulary are able to be transferred to student experience.

Findings

My findings section begins as a review of the data collected throughout my intervention, organized around my three Expected Changes. Next, I will review the effectiveness of my implementation. Finally, in implications, I will explain and analyze the trends I identified. I will also share additional findings and unexpected outcomes. The following sections will be presented in narrative form with accompanying charts and graphical data, which were created by Claude AI using input from my quantitative data. See Appendix for all data, including Pre & Post Intervention Raw Data for EF Skills and FFMQ-15 (Data A1), Findings Charts (Data A2), End-of-Year Student Interview Notes (Data A3), and Post-Assessment Google Form and Responses (Data A4).

Impact of the Intervention

The intervention was designed to support students' executive functioning and self-regulation by embedding mindfulness practices, social-emotional lessons, and explicit strategy instruction into the daily classroom schedule. The three expected changes were that students would explain key terms and vocabulary related to self-regulation and mindfulness (Expected Change 1), that students would use a toolbox of strategies for self-regulation (Expected Change 2), and that students would become more mindful (Expected Change 3). The overall impact of my intervention was that students developed strong vocabulary knowledge, built and applied a range of self-regulation strategies in real-world contexts, and showed growth in mindfulness as measured by the FFMQ-15. This section details the impact of the intervention on each expected change.

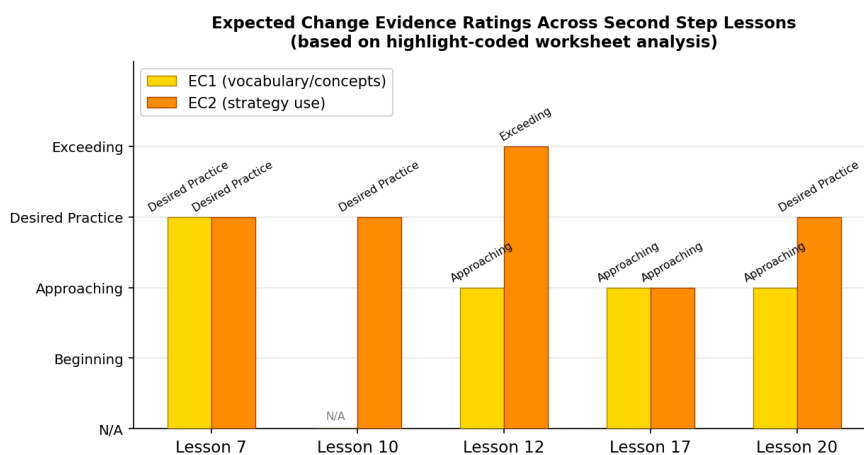
Expected Change 1: Students Explain Key Terms, Vocabulary, and Concepts

My theory of action anticipated that explicit instruction in mindfulness and self-regulation vocabulary, through Second Step lessons, body systems science content, and daily strategy practice, would enable students to name, define, and apply key concepts related to executive functioning. The data show that students made gains in conceptual vocabulary across the course of the intervention.

Vocabulary Use in Second Step Curriculum Written Responses. Across five Second Step lesson handouts analyzed using a color-coded highlight coding system, student responses showed EC1 evidence ranging from Approaching to Desired Practice levels. (See Appendix for Figure B1: Second Step Unit Outline, and Table B2: Second Step student worksheets and Highlight Code Rubric.)

Figure 2

EC1 and EC2 Evidence Ratings Across Second Step Lessons. Bars reflect the presence and strength of highlight-coded evidence per lesson.



In Lesson 7, the earliest analyzed lesson, students identified and applied emotion vocabulary in context with enough precision and depth to earn a Desired Practice EC1 rating, the highest across the five lessons. When practicing with the vocabulary word "rethinking," one student wrote, "Rethinking can help when you feel big emotions, and sometimes rethinking it helps you balance out those emotions." This early evidence suggests that students may have had some foundational vocabulary knowledge and that the curriculum helped them apply it. Students also exhibited recall of this term more than two months later when completing the post-assessment (see below and Appendix for specific responses).

In Lessons 12, 17, and 20, student written responses showed Approaching-level EC1 evidence, with students applying key terms accurately but with varying elaboration. These data are based on written work, not discussions. Their discussions during lessons incorporated a level of vocabulary usage applicable to Desired Practice. Students also demonstrated use and retention of specific questions and phrases they can use to solve problems. One example is in Lesson 12, where students practiced asking questions to share perspective. One student wrote, "I can

understand how you feel about this situation. How about... How does that sound?" Another student wrote, "What was your experience?" and, "We should compromise." These responses imply that students understand perspective and compromise by retaining and using problem-solving phrases. Lesson 20, the STEP problem-solving performance task, students labeled all four STEP steps on their handouts, and, as I wrote in my teacher reflection journal, more than half of students were also able to name all four STEPs during one morning meeting the following week.

Demonstrated Knowledge: Post-Assessment & Interviews. In the post-assessment survey, students demonstrated strong retention and application of key vocabulary. All 15 students (100%) correctly named all four steps of the STEP strategy: "Say the problem, think of solutions, explore outcomes, and pick one." Additionally, 10 of 15 students (67%) agreed or strongly agreed with the statement "I know how to use terms like self-regulation or the nervous system when talking about my behavior." When asked which body system is responsible for sending stress and calm signals, 93% of students correctly responded with the nervous system, and 60% of the students also identified that the respiratory system takes in oxygen and releases carbon dioxide.

Several open-ended definition responses demonstrate students who are able to connect their own experiences with the vocabulary of rethinking, mindfulness, and self-regulation:

"Being mindful means being self-regulated and calm. It also means to be aware of your surroundings and other people." - Student, Google Survey

"Rethinking is thinking back on what you, or someone else, has done. This is useful when you are stressed or angry." - Student, Google Survey

“Self regulation is calming your body down and making sure you’re physically doing the right thing. Mindfulness is mentally doing the right thing. Mindfulness can help you do this.” - Student, End-of-Year Interview

“Rethinking is taking the time to rethink a situation — if you are mad at someone because they did something, you could rethink the situation and be less mad by thinking of other possibilities why they did it.” - Student, End-of-Year Interview

Using the lessons to make sense of their own lives aligns with the Zelazo et al. (2016) observation that reflection and self-awareness develop alongside EF skills when students are given structured, repeated opportunities for practice. In the Google Survey post-assessment, 100% of respondents were able to write a meaningful question they could use to understand someone else's point of view, showing retrieval of the vocabulary from Second Step Lessons 12. Questions included, "What are you feeling right now?" and, "What is your point of view?" and, "Hey I have my opinion on what happened but can you tell me what happened for you?"

In summary, the data from worksheets, the post-assessment, and end-of-year interviews support Expected Change 1. Students developed strong vocabulary knowledge throughout the intervention, shown by some students' metacognitive articulation and universal retention of core concepts like STEP.

Expected Change 2: Students Use a Toolbox of Strategies and Skills

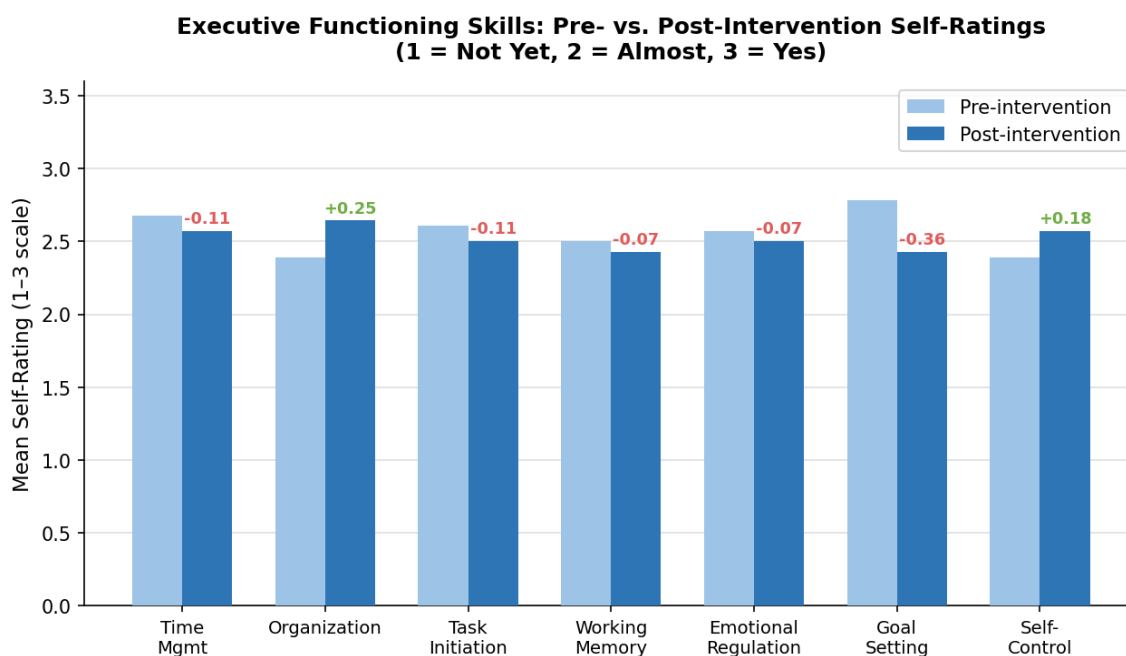
My theory of action anticipated that consistent practice with Second Step lessons, mindfulness activities, and explicit strategy instruction would enable students to build and apply a toolbox of self-regulation strategies. The data show strong evidence of strategy use across all five lessons, the post-assessment, and the end-of-year interviews, with particularly compelling

evidence of real-world transfer: students applying strategies in home contexts, novel situations, and moments of genuine emotional challenge.

Pre vs. Post Intervention Executive Functioning Data. Before the intervention, students self-evaluated their executive functioning skills on the EF Skills rubric. The class average pre-intervention rating was 2.56 out of 3.0, indicating that students generally rated themselves as “almost” meeting most EF skill criteria at baseline. Following the intervention, students completed two post-assessments intended to measure their self-reports of EF. One measure was the same EF survey that they took before the intervention. This showed a class average change from 2.56 to 2.52, a decrease inconsistent with my hypothesis. This may be due to increased student self-awareness following the intervention, which I explore further in the Implications section. The two facets of EF that did show growth were organization (+0.25), and self-control (+0.18).

Figure 3

Pre/Post EF Skills Self-Evaluation Scores by Skill (teacher-rated, 1–4 scale, $n = 13–15$). Class average decreased slightly from 2.56 to 2.52.



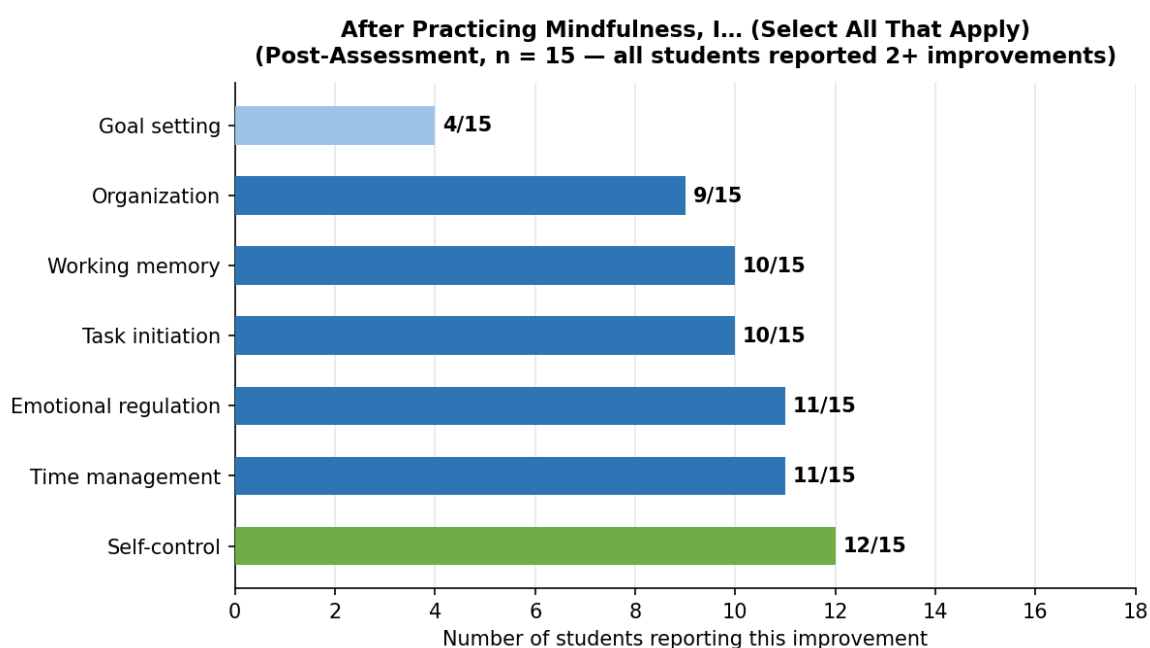
A second measure of EF skill development following mindfulness practices was a question included in the Google Survey given to students: "After practicing mindfulness, I... (select all that apply)." The options included scenarios such as "I raise my hand more instead of shouting out (self-control)." There was one scenario for each subset of EF. Results are shown in the figure below. There was also an option for "I already did all of these things; mindfulness doesn't change it." All 15 post-assessment respondents independently identified two or more executive functioning improvements. Self-control was rated as having the most improvement, with 12 of 15 students agreeing that they have greater self-control after practicing mindfulness. This is notable because across both the EF Skills pre/post rubric and the Google Survey, self-control showed an increase following the intervention. This would be considered growth in

inhibition, outlined by Loher & Roebbers (2013) as one of the three main structural components of EF.

Figure 4

Self-Reported Executive Functioning Improvements After Practicing Mindfulness

(Post-Assessment, n = 15). All 15 students identified 2+ improvements.



Strategy Application in Second Step Activities. Second Step lessons teach strategies for socio-emotional learning and problem solving. Student worksheet responses across all five analyzed Second Step lessons demonstrate consistent evidence of strategy use, with EC2 lesson evidence ratings shown in Figure 2. The strongest evidence comes from Lesson 12, "Ask, Listen, Learn," in which students enacted multi-step empathy strategies, including active listening, perspective-taking, and compromise, as they created and acted out a conversation between a Mom and Grandma discussing technology. This lesson earned an Exceeding EC2 rating, the

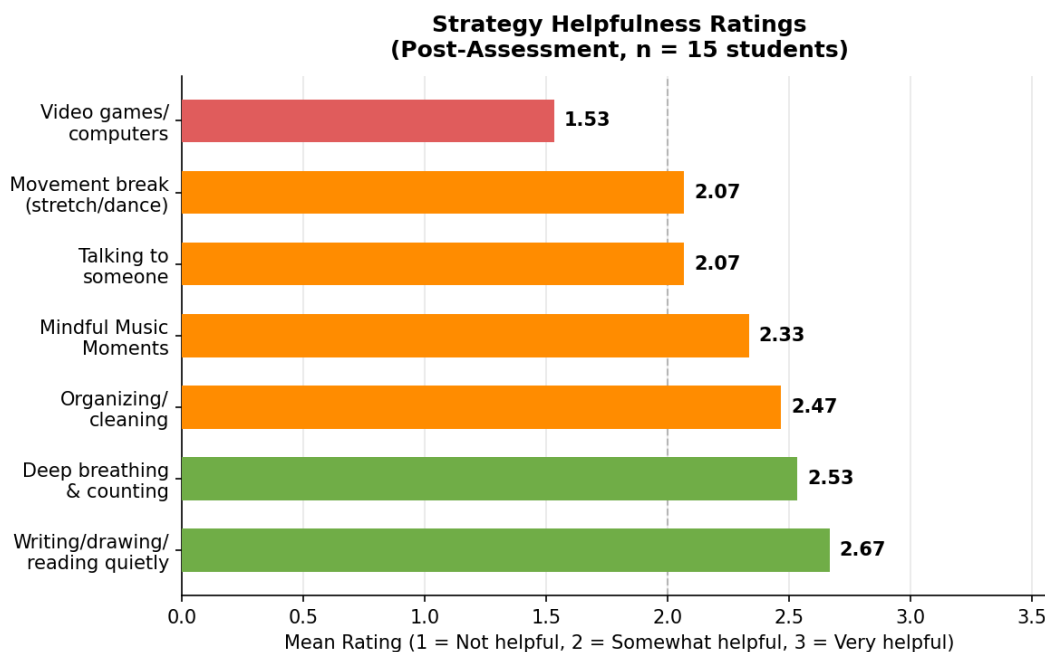
highest in the dataset. Lesson 20, the STEP problem-solving performance task, also showed strong evidence: students applied the STEP framework flexibly to a novel conflict scenario, earning a Desired Practice EC2 rating.

Across all five lessons, orange EC2 highlights mark student responses where strategy use was particularly evident (see appendix for worksheets and rubric). The consistency of this evidence across diverse lesson types, from emotion identification (Lesson 7) to empathy practice (Lesson 12) to conflict resolution (Lesson 20), suggests that students added these strategies to their toolbox following repeated practice. Student recall during post-assessments demonstrated that these strategies were retained long-term.

Strategy Helpfulness and Independent Use: Post-Assessment. As well as practicing socio-emotional skills with Second Step, the intervention involved consistent mindfulness and self-regulation practice. These involved a variety of types of strategies, ranging from movement breaks to deep breathing. I emphasized to students that mindfulness can take many forms, as long as it involves increased awareness of internal state. In the post-assessment survey, students rated seven self-regulation strategies for helpfulness on a 1–3 scale. Results are shown below.

Figure 5

Strategy Helpfulness Ratings (Post-Assessment, n = 15). Scale: 1 = Not helpful, 2 = Somewhat helpful, 3 = Very helpful. Writing/drawing/reading and deep breathing rated highest.



Writing, drawing, or reading quietly received the highest average rating (2.67), followed by taking deep breaths and/or counting (2.53) and doing a movement break (2.47). Video games and computers were rated lowest (1.53), suggesting that students have developed meaningful discrimination between a preferred activity and a strategy. As Dawson and Guare (2009) note, the ability to identify which strategies work for an individual is itself an executive functioning skill. This is especially meaningful knowing that the majority of students in my class jump at the chance to access computers.

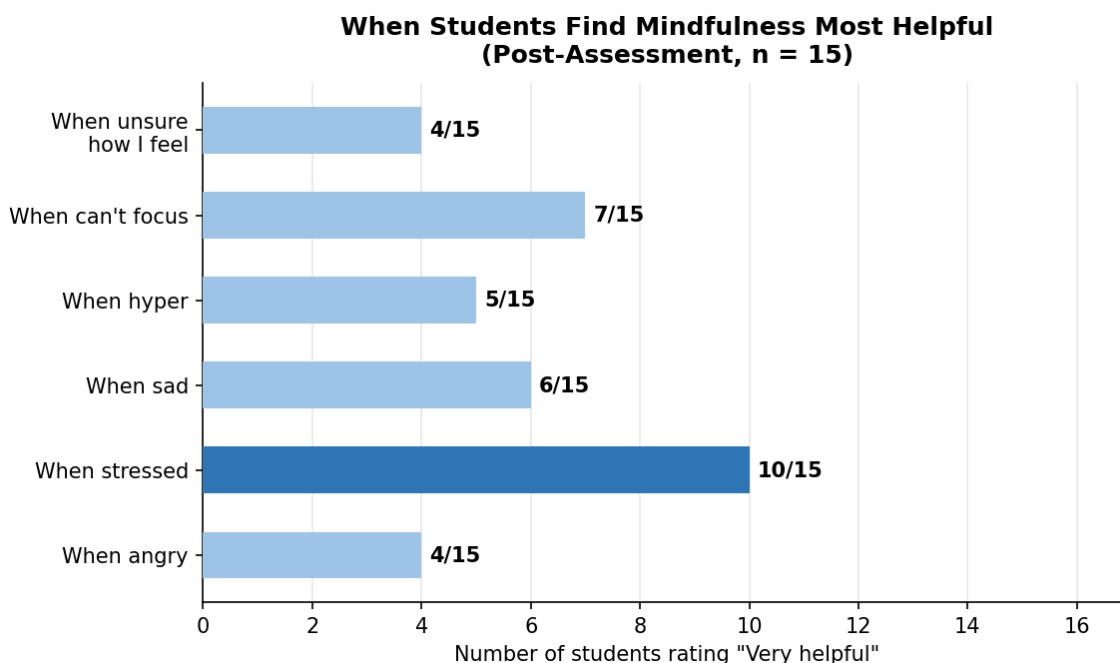
Another piece of evidence that is not directly reflected in the survey data comes from my observation and research journal regarding the involvement of instrumental music in the classroom. Many students began requesting music as a focus or relaxation tool during quiet work or testing time. I noticed a dramatic change in one of my students who struggles most with EF

when he had access to music. We worked with his case manager to curate a playlist for him to use during independent work; he loved Egyptian music, movie and video game soundtracks. In situations where he might normally need one-on-one support to complete a task, he was able to use music to stay focused and positive on his own. He advocated for this tool often, and his parents were on board as they packed him headphones from home. Many other students also requested to take in-class assessments while listening to focus music, voicing that it helps them to relax and avoid distractions. I did not play music out loud during assessments, but I did allow students to connect to their headphones and access my music resources on Google Classroom. During quiet classwork, all students agreed that they wanted instrumental sounds played out loud. These parts of our day were always the most focused and productive, as I wrote in my journal: "Thank you for the music!"

Students rated mindfulness strategies as most helpful when they are stressed: 10 of 15 students (67%) indicated mindfulness is “Very helpful” in this context, the highest of any emotional state. This aligns with research by Ritter and Alvarez (2020) and Flook et al. (2010), who found that mindfulness-based interventions are most effective in contexts of heightened stress.

Figure 6

When Students Find Mindfulness Most Helpful (Post-Assessment, n = 15). Students selected all contexts that apply.



An interesting discrepancy emerges when comparing this survey data with end-of-year interview responses. On the post-assessment, "when angry" received one of the lowest "very helpful" ratings of any context, selected by only 4 of 15 students (27%), tied for last with "when unsure how I feel." Yet in end-of-year interviews, anger was one of the most consistently and confidently named areas where students felt mindfulness had made a concrete difference. Asked to identify a specific feeling or situation they had handled better since practicing mindfulness, multiple students named anger unprompted:

"Definitely anger." - Student, End-of-Year Interview

"When I'm getting angry, like when I'm doing group work, I like doing breathing exercises." - Student, End-of-Year Interview

“Probably little arguments that happen. If it was a big one I would talk to a teacher, but for little ones I can do it myself.” - Student, End-of-Year Interview

“Probably anger — because I used to get angry but now I have strategies to deal with that.” - Student, End-of-Year Interview

This discrepancy may be a result of the question posed; the survey asked when students find mindfulness most helpful, while my interview question asked which feeling students had handled better since practicing mindfulness. In any case, students have internalized mindfulness as a tool for handling uncomfortable emotions.

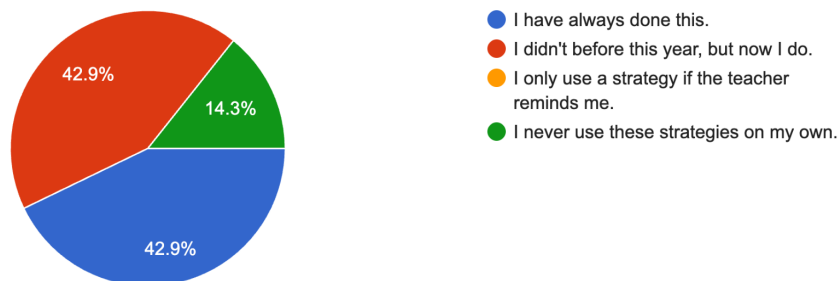
Strategy use frequency data reveals change attributable to the intervention. Six of 15 students (42.9%) reported that they have always used a strategy when they feel stressed, overwhelmed, or too energetic, suggesting pre-existing self-regulation capacity. Six additional students (42.9%) reported “I didn’t before this year, but now I do,” indicating intervention-attributable growth. Combined, over 80% of students now use at least one self-regulation strategy independently. As Shelach Inbar et al. (2025) note, transfer to independent use is the highest-order indicator of genuine skill development.

Figure 7

Strategy Use Frequency (Post-Assessment, n = 14). "I didn't before this year, but now I do" (42.9%) represents strategies students attribute to this intervention.

When you feel stressed, overwhelmed, or too energetic, how often do you use a strategy (like mindful breathing, counting, music, or movement) on your own?

14 responses



Real-World Strategy Transfer: End-of-Year Interviews. The most compelling evidence for Expected Change 2 comes from the end-of-year interviews. Eight of ten students provided specific, concrete examples of using strategies in contexts outside the classroom, without teacher prompting. The specificity, variety, and unprompted nature of these examples suggests that students have integrated strategies into their daily lives, not just their school behavior. Students described applying strategies during family conflicts, academic stress, physical fear, and difficulties falling asleep:

"This morning my brother was being disruptive and he kept trying to hit me with his binder. I took a second to calm down because I was really annoyed and took a few deep breaths and confronted him. It made me a lot calmer and I wasn't yelling at him." -

Student, End-of-Year Interview

"Sometimes when my brother annoys me I just need to walk away from him, take a moment, and use a calmer tone of voice." - Student, End-of-Year Interview

"When I was in North Carolina there was a play structure and I was at the very top. I was very scared of falling but I took deep breaths using box breathing because it was a boxy structure." - Student, End-of-Year Interview

"A week ago I had a Coke before bed, so I was freaking out because I couldn't sleep. I was taking deep breaths so that I wouldn't freak out." - Student, End-of-Year Interview

"One time my sister and I got in a fight, and I calmed down and said sorry to her. After that I just did the STEP thing and retraced it and then I just let go of it." - Student, End-of-Year Interview

"I can handle if I get in a fight I can just walk away instead of arguing. Mostly then we just forget about it and it's in the past." - Student, End-of-Year Interview

Students are describing the specific strategy, context, and outcome. The strategies they use came from a combination of mindfulness and self regulation practice, and from Second Step socio-emotional practice. This shows application of both strands of the intervention. Anna's situation occurred within hours of the interview, and Zora applied box breathing in a new context (a playground structure in another state), demonstrating flexible application that Zelazo and Carlson (2020) describe as a sign of developed self-regulation.

In summary, Expected Change 2 is supported by the strongest body of evidence in this dataset. Strategy use is demonstrated in all five Second Step worksheet lessons, 80% of students report independent use, and eight of ten interview participants describe specific real-world transfer examples. The range and spontaneity of these transfer examples suggests that self-regulation strategy use happened for many of my students.

Expected Change 3: Students Are More Mindful

My theory of action anticipated that consistent embedded mindfulness practices, including Mindful Music Moments, structured brain breaks, and reflection, would increase students' capacity for mindfulness. The data from the FFMQ-15, end-of-year interviews, and post-assessment supports this expected change, as outlined in this section.

An important finding about Expected Change 3 is that Second Step lessons do not target mindfulness. Across all five analyzed worksheet lessons, no blue EC3 highlights were applied, because I found that Second Step activities focus on strategy instruction rather than the experience of mindful awareness. Second Step recently added a new component to their website called Mind Yeti that provides explicit mindfulness videos, but it is not yet integrated into their lessons. We watched three of the short videos, but discontinued as my students felt that it was geared towards a younger audience. My classroom practices that most directly address mindfulness occurred separately from the Second Step worksheet tasks and are therefore not captured by the worksheet-based coding system.

Baseline Data. Students completed a post-assessment item asking whether they had practiced mindfulness before this school year. Their responses provide baseline context: four students reported already knowing and practicing mindfulness regularly, four wrote-in the "other" option to report some prior exposure at home or in other grades, five had heard of mindfulness but had not practiced it, and two had never encountered mindfulness before.

Figure 8

Student Prior Experience with Mindfulness (Post-Assessment, n = 15). Responses grouped from open-ended survey item: "Had you practiced mindfulness before this year?"

Had you practiced mindfulness in different classes, grades, or at home?

15 responses

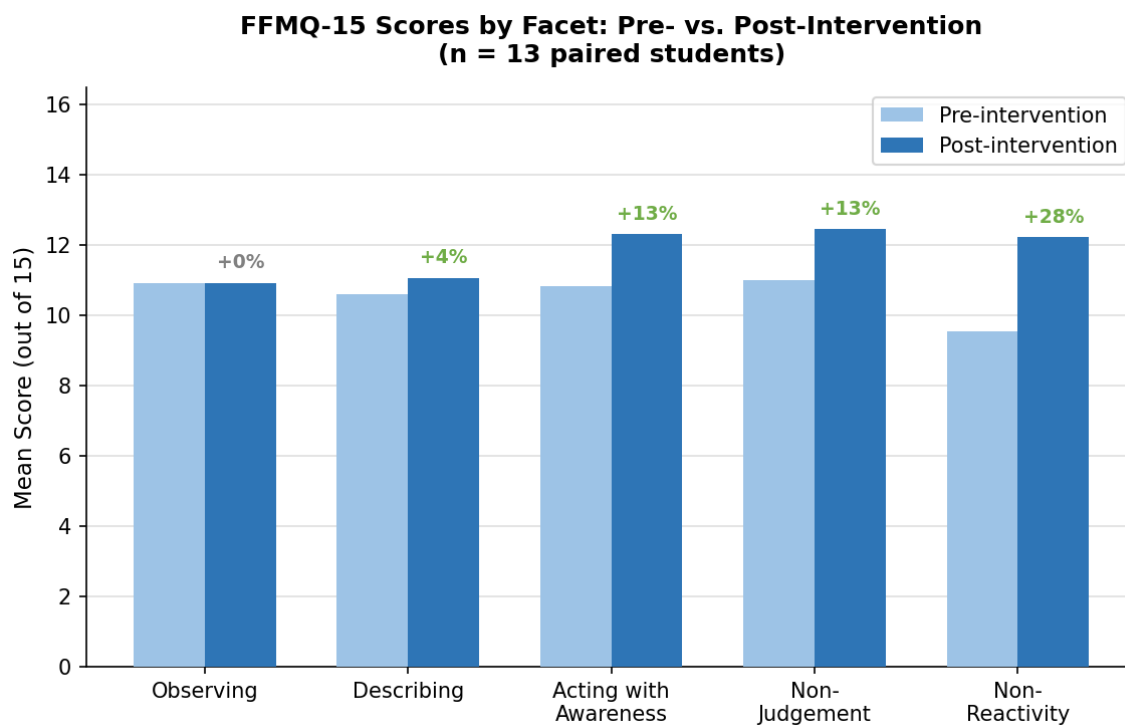


The FFMQ-15 was administered pre- and post-intervention to 13 paired students (three additional students completed only the post-assessment so were not included in analysis). The class pre-intervention FFMQ-15 average was 52.92 out of 75, indicating a moderate baseline across the five mindfulness facets. The Non-Reactivity facet showed the lowest pre-intervention mean ($M = 9.54$ out of 15 possible points), identifying the ability to observe thoughts and feelings without reacting as a relative area of growth for this group.

FFMQ-15 Results. Class-level results show consistent improvement: the post-intervention average of 59.00 represents an overall increase of 11.5% from the pre-intervention baseline of 52.92. Ten of 13 paired students (77%) showed improvement; one was unchanged; two showed a slight decrease. Pre- and post-intervention scores by facet are shown below.

Figure 9

FFMQ-15 Scores by Facet: Pre- vs. Post-Intervention ($n = 13$). Non-Reactivity showed the largest gain (+28%). % change annotations shown above post bars.

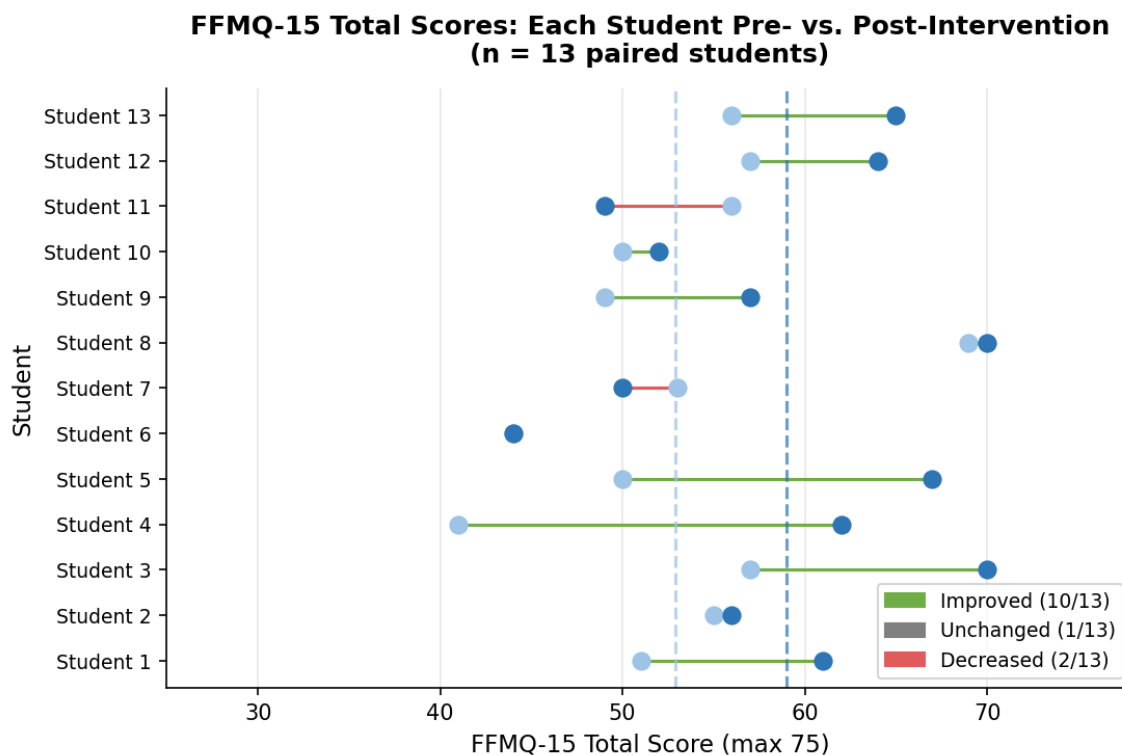


The Non-Reactivity facet showed the largest growth, increasing by 28.2% (pre M = 9.54, post M = 12.23). Acting with Awareness and Non-Judgement also showed larger gains (+13.5% and +13.3%, respectively). Observing, the ability to notice subtle sensory experiences, showed no change (0%), which is consistent with the developmental literature: Zelazo and Carlson (2020) note that fine sensory observation is a developmentally advanced mindfulness skill which makes it unlikely to emerge from a brief intervention.

The growth in Non-Reactivity is important to this research. The ability to pause and notice a feeling without being swept away by it represents a meeting point between mindfulness and executive functioning. It is also the capacity most reflected in the interviews in the next section.

Figure 10

FFMQ-15 Total Scores: Individual Student Pre/Post Comparison (n = 13). Green lines = improved; red = decreased; grey = unchanged. 10 of 13 students showed overall improvement.



It is important to interpret these FFMQ-15 results with an understanding of what it actually measures (see appendix for the questionnaire). The FFMQ-15 was designed to assess mindful awareness across all parts of daily life, including noticing sensory details such as the feeling of water in a shower (e.g.). My intervention was embedded in the school day and designed to support in-the-moment self-regulation, not to cultivate mindful awareness across all life contexts. My honest assessment is that the intervention made students more mindful during and immediately after a practice, and gave them a toolbox of strategies, but it did not transform them into more broadly mindful people in all areas of their lives. The modest overall FFMQ-15 gains reflect this. That said, most students showed growth in at least one facet, and Non-Reactivity showed the largest gain by a significant margin. The capacity to have a feeling without immediately acting is the skill that mindfulness-based self-regulation targets, and a substantial gain there is arguably the most meaningful outcome of this intervention.

Student Narratives: End-of-Year Interviews. In the end-of-year interviews, nine of ten students expressed some dimension of increased mindful awareness. These narratives align with and enrich the FFMQ-15 data, offering qualitative texture to the quantitative gains:

"There is always a time of chaos during lunch and then some of those mindfulness moments can be like a break — an oasis of calm in a way." - Student, End-of-Year Interview

"I've been more observant." - Student, End-of-Year Interview

"I think I have become more mindful because I am more aware of things that are happening but I don't get distracted by it." - Student, End-of-Year Interview

"Mindfulness... calmed my brain down and got me ready for learning...I let go of any past things that I didn't want in my mind. I practiced with my mom. She meditates and I join her." - Student, End-of-Year Interview

Several students connected mindfulness specifically to an increased capacity for non-reactive responding, which is the same dimension captured by the FFMQ-15 Non-Reactivity facet. Anna described pausing and choosing her response during a conflict with her brother. Lochlan described sitting quietly after getting in trouble, using reflection to "get a hold of and understand better" what he should do. These descriptions match the Non-Reactivity gains (+28.2%) seen in the quantitative data, providing multi-source evidence for Expected Change 3.

In summary, Expected Change 3 is not evidenced in Second Step worksheets, but is supported by FFMQ-15 data, interview narratives, and post-assessment self-report. The 11.5% overall FFMQ-15 gain, the striking 28.2% increase in Non-Reactivity, and the qualitative

accounts of increased mindful awareness from nine of ten interview participants provide multi-source evidence of meaningful growth in students' capacity for mindfulness.

Summary of Impact Findings

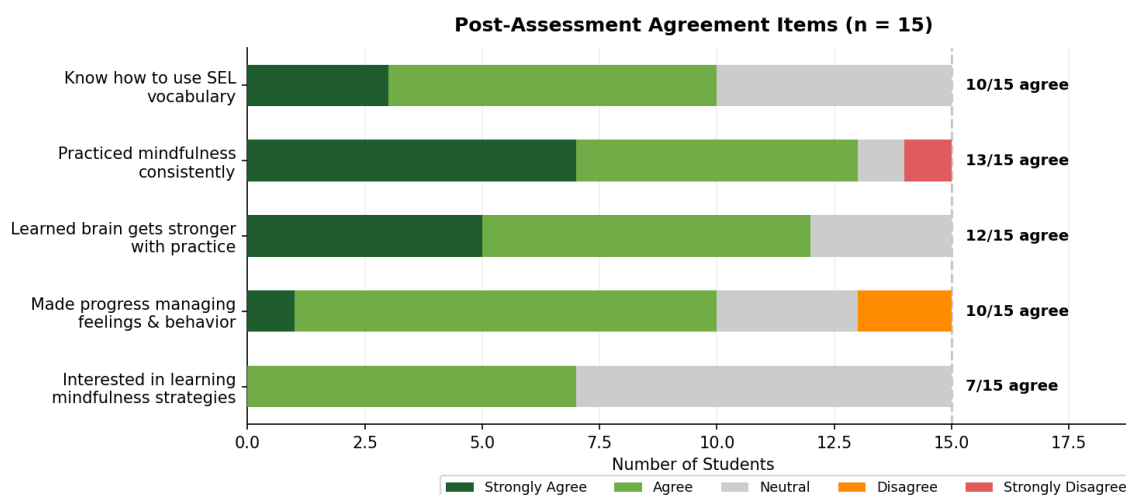
The impact data was analyzed to determine the impact of the intervention across three expected changes. The data shows that students developed their metacognitive and socio-emotional vocabulary (Expected Change 1). The data also show that students built and applied a broad toolbox of self-regulation strategies, with 80% reporting independent use and eight of ten interview participants describing specific real-world transfer examples (Expected Change 2). Finally, FFMQ-15 data and interview narratives confirm growth in students' mindfulness capacity, with the Non-Reactivity facet showing the largest single-facet gain at +28.2%, a finding that supports inhibitory control outcomes that Zelazo and Carlson (2020) name as central to executive functioning development (Expected Change 3).

Self-Reported Progress

Post-assessment agreement item data was the final question on the Google Survey and provides a student-based summary of Findings. Thirteen of 15 students (87%) agreed or strongly agreed that “We practiced mindfulness consistently throughout the week.” Twelve of 15 (80%) agreed or strongly agreed that “I learned that my brain can get stronger by practicing focus and self-regulation skills.” Ten of 15 (67%) agreed or strongly agreed that “I feel like I made progress in how I manage my feelings and behavior.” Results are shown below.

Figure 11

Post-Assessment Agreement Item Responses (n = 15). SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree.



The high consistency rating (13/15) confirms that students felt mindfulness practices were embedded in their routine. The “brain gets stronger” item (12/15) is encouraging: Baggetta and Alexander (2016) identify that believing EF skills are malleable is a key baseline for development. Hopefully these students have a strong foundation for continued growth beyond this intervention, even if 8 of 15 students felt neutral about learning mindfulness strategies!

Implementation of the Intervention

Two key elements of the intervention were daily mindfulness practices (Mindful Music Moments, breathing exercises, structured quiet time) and Second Step social-emotional learning lessons during Morning Meeting. These are both subscription-based resources which I explored because they related to my problem of practice. Both programs gave me a free trial; Mindful Music Moments spanned the full school year, and Second Step lasted for the duration of my intervention. I supplemented these two resources with brain breaks throughout the day, examples

of which are in Figure 12 below. This section explores the fidelity and efficacy of the implementation design.

Mindfulness Practice Consistency & Brain Breaks

Mindfulness practices were implemented daily throughout the intervention period, with at least one mindful exercise practiced per day. This was mostly accomplished using Mindful Music Moments, but also included some transition exercises or brain breaks. Student responses (in Figure 11 above) confirm this: 13 of 15 post-assessment respondents (87%) agreed or strongly agreed that "We practiced mindfulness consistently throughout the week." This was driven by Ritter and Alvarez's (2020) finding that brief but frequent practice produces more improvements than longer, less frequent practice.

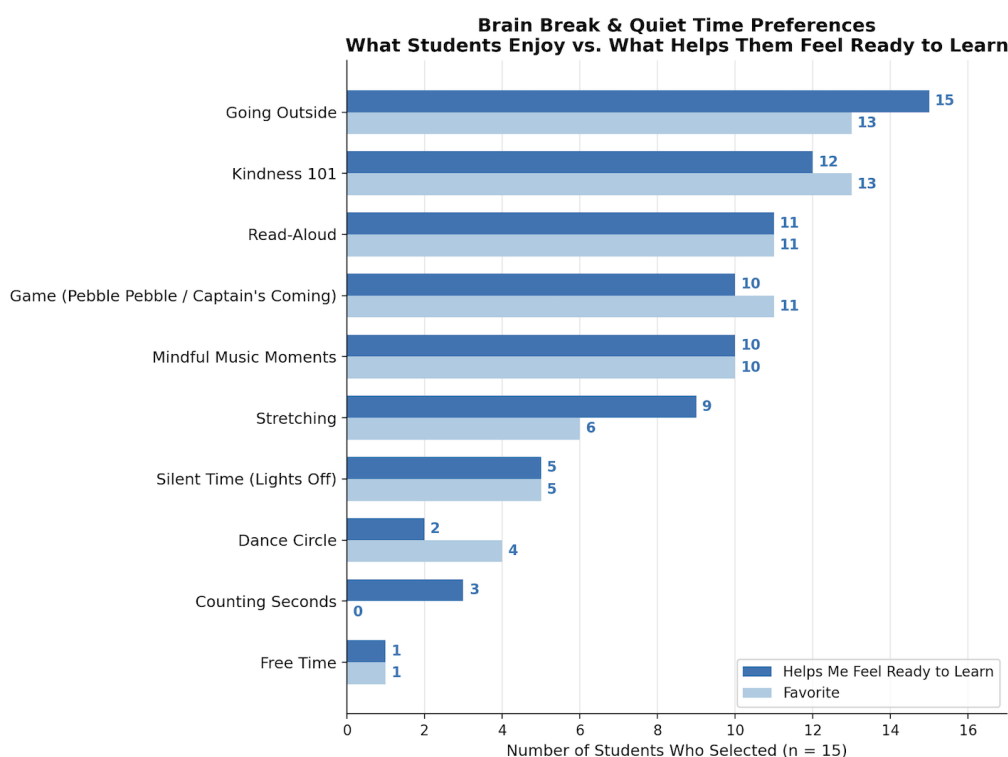
A brain break in my classroom meant between 2 and 15 minutes of non-academic work, specifically geared towards student needs with purpose explicit. For example, if students had been sitting for an extended period of time, we might go outside or play a focus game. If students had just finished group work, we might do silent time, stretching, or read-aloud to self-regulate. If students transitioned on time after lunch, we connected our socio-emotional with something we called Kindness 101; Steve Hartman's "On the Road" is a 2-3 minute weekly CBS News television series featuring inspiring stories about people across America (see appendix for resource).

Brain breaks are common in most elementary classrooms, and my specific types of break are not unique. However, during my intervention I made clear to students the goal of the break using content-specific vocabulary, such as going outside to get their circulatory and respiratory systems moving, taking a nature walk to be mindful of their surroundings, or watching Kindness 101 to apply what we learned from a Second Step lesson. This explicit connection is what made

the breaks different from before the intervention. As shown in the figure below, the post-assessment asked students which brain breaks were their favorite, and which ones helped them feel ready to learn afterward.

Figure 12

Brain Break & Quiet Time Preferences: What Students Enjoy vs. What Helps Them Learn (n = 15). Dark Blue = Helps Learn; Light Blue = Favorite.



Favorite and *effective* did not always match, but often they were close. Going outside was the top pick overall: 13 of 15 students named it a favorite, but all 15 said it helped them refocus, including the two who hadn't listed it as a favorite. Stretching and counting seconds showed the same pattern, rated as more helpful than favorite. Dance circle ran the other way, more popular than effective. In descending order of ratings, Read-aloud, Mindful Music Moments, and silent

time were rated equally as helpful as favorite. Keeping a range of brain breaks in rotation was important, and this feedback data is useful to guide my brain break planning with future classes.

Mindful Music Moments

Mindful Music Moments during quiet time after lunch was effective at establishing a mindful classroom climate, and it received positive reviews from students. Lochlan described it as “an oasis of calm.” Zora noted that Mindful Music Moments and breathing exercises were the most helpful parts of the intervention. This component appeared to be the strongest driver of the mindfulness-specific outcomes reflected in the FFMQ-15 data.

Post-assessment survey data further support the effectiveness and student reception of Mindful Music Moments. Students rated their enjoyment of both programs on a 1–5 scale, and were asked whether they would choose to continue Mindful Music Moments the following year.

Figure 13

Student Enjoyment Ratings: Second Step Lessons vs. Mindful Music Moments (Post-Assessment, n = 15, 1–5 star scale). Mindful Music Moments received a higher average rating (4.1 ★) than Second Step (3.3 ★).

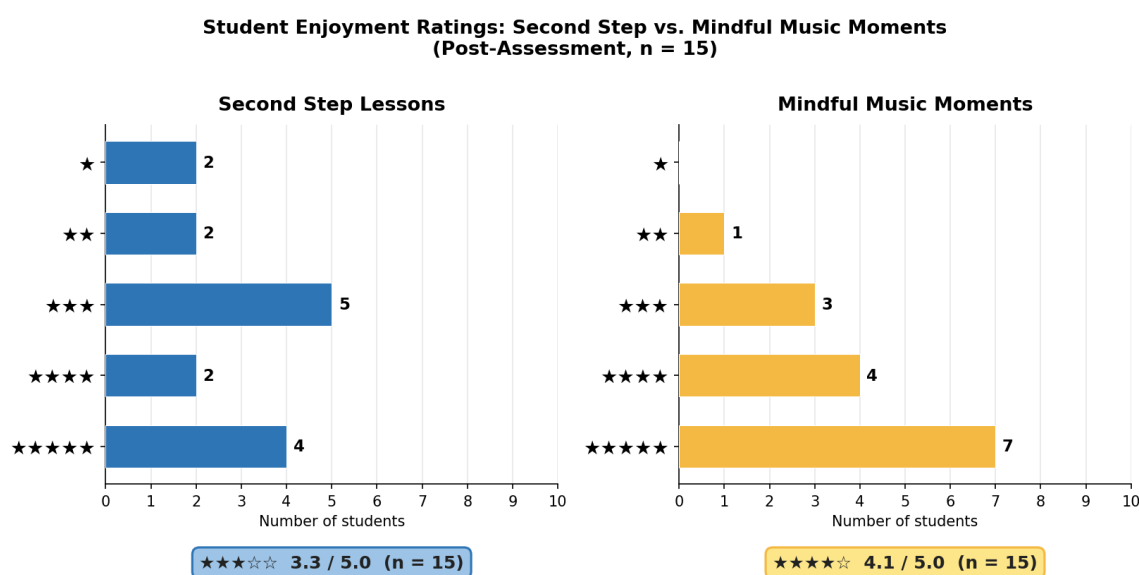
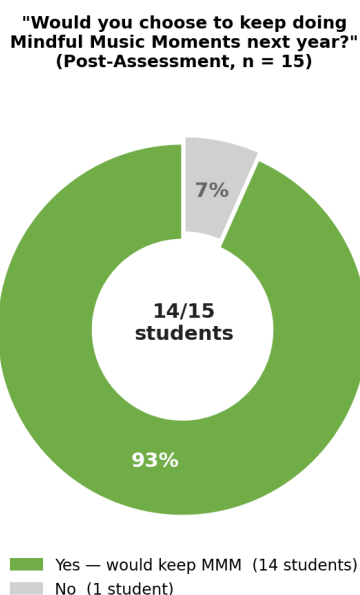


Figure 14

Student Preference: Would You Keep Mindful Music Moments Next Year? (Post-Assessment, n = 15). 14 of 15 students (93%) chose Yes.



One other aspect of my Mindful Music Moments implementation was that I provided students with "emotion wheels" to help them identify how each audio made them feel, followed by class conversations about their identified emotions. Based on my observations, students became both more comfortable discussing emotions in general and faster at identifying how a song made them feel. We progressed from simple, eight option emotion wheels at the beginning of the intervention to more specific and complex wheels advertised for middle school students. Students identified emotions from calm, to hopeful, to excited, to "feeling like I am falling." This practice acted as a bridge between our socio-emotional lessons and the mindful practices, although in hindsight I could have been more explicit about this connection with my students.

Second Step Curriculum Implementation

The Second Step lessons were delivered as planned during Morning Meeting and snack time. Implementation data, including student worksheets and post-assessment responses, confirms that students found the curriculum useful, particularly for learning transferable strategies. As Caroline noted, it was useful to learn "how to do things so that later at school or at home you can use it." Cooper echoed this: they are "learning practices that can help me later on out of school or in school."

However, a notable pattern emerged in the implementation data: five of ten end-of-year interview participants distinguished between Second Step activities and mindfulness practices, expressing greater value for the latter. June stated, "I don't really like the second step lessons but I do like the breathing exercises and the mindful music." Zora observed, "The second step didn't help as much as other things because I didn't see how it connected to mindfulness." I explore what this pattern may mean in the Implications section below.

It is worth noting that the highlight-coding system used to analyze Second Step worksheets, described above under Expected Change 1 and Expected Change 2, was based only on students' written responses. In Lesson 17, for example, students wrote only two sentences on their handouts, earning an Approaching rating based on my rubric in the Appendix. That coding did not capture the group discussion, roleplaying, and acting out of scenarios that took place during the lesson itself, or students' overall engagement with the topic. See Table B2 in the Appendix for links to student handouts from each analyzed lesson; readers unfamiliar with the Second Step curriculum may also wish to consult the program's [website](#) for examples of what a full lesson looks like.

One example of this kind of engagement not visible in the worksheet data showed up later in the year as a spontaneous skill transfer. I observed two boys arguing over sharing a toy and said, “Hey, this reminds me of the Second Step ukulele problem. How did you solve that problem, and can you use those skills now?” With that prompting, both boys quickly identified the problem and compromised on a solution.

Additional Findings and Unexpected Outcomes

Pieces of data I expected to use within my findings and analysis were the student mindfulness journals. These journals were an important tool for my students and a valuable part of my implementation; however, I did not collect or evaluate these journals for student privacy reasons. Students used their journals as places for personal reflection, illustration, and poetry, and I did not feel it was appropriate to collect them for my project. The journals went home with students to be used throughout the summer.

A finding that merits additional discussion is the degree to which students demonstrated self-initiated strategy use that extended well beyond the classroom without teacher prompting. This was not anticipated in the original expected changes framework and has meaningful implications for understanding the depth of the intervention’s impact.

Across the end-of-year interviews, students described applying self-regulation strategies in family conflicts (Anna, Cooper, Surina, Jack), novel environments (Zora), at home in the evening (Chloe, Surina), and during daily reflective practice (Lochlan). Surina described practicing meditation with her mother at home.

One particularly interesting pattern was the use of the STEP strategy, even without students officially calling it “STEP” as they used it. In the final week of school, I observed a group of my students return from recess obviously frustrated. One of them said “Guys, we just

need to use the STEP thing and talk about it," which they proceeded to do. Even if they did not name each step explicitly, they had practiced the skill enough to apply it on their own. They had the common language to know what he meant, and together named the problem and came to a compromise. Surina described the same process in her interview: "After that I just did the step thing and retraced it and then I just let go of it." Lochlan described a similar reflective process of reviewing a situation quietly in his mind. Even though the connection between Second Step and mindfulness was not clear to students, they were able to connect the vocabulary skills of Expected Change 1 with the mindful release associated with Expected Change 3. This is consistent with Shelach Inbar et al.'s (2025) finding that integrating mindfulness into instruction may produce benefits including transfer across social and academic contexts.

It is also worth noting that six of fifteen post-assessment respondents reported that they "have always done" self-regulation strategies when stressed or overwhelmed on their own (Figure 7). This group of pre-existing self-regulators prompts a differentiation question: what was the benefit of the intervention for students who arrived with strong baseline skills? Flook et al. (2010) note that mindfulness-based interventions tend to produce the greatest gains for students who struggle most. I return to this question in Looking Forward below.

Implications and Conclusions

This study examined whether embedding a consistent mindfulness-based intervention into a fourth-grade classroom would support students' executive functioning and self-regulation. Data was collected across six sources: Second Step worksheet activities, teacher observation, a post-assessment survey, end-of-year interviews, pre/post FFMQ-15 measures, and pre/post EF skill self-assessments. This section draws together the key implications of the findings,

acknowledges the limitations of this study, and describes what I intend to carry forward in my teaching practice.

In summary, I found that explicitly teaching mindfulness, self-regulation, and social-emotional skills was effective for my class, especially for the Self-Control facet of EF and the Non-Reactivity facet of mindfulness. They transferred strategies on their own to situations in and out of the classroom, and they grew most in their ability to pause and respond thoughtfully before acting.

Why These Patterns Occurred

It was difficult for me to analyze every facet of executive functioning for impact, but I also believe I ended up teaching social skills, self-regulation, and mindfulness exercises more than executive functioning broadly. Second Step is designed as a social-emotional learning curriculum, so its activities naturally pull instruction toward skills like perspective-taking and conflict resolution rather than executive functioning. Furthermore, many of the Second Step activities were not well suited to practicing EF vocabulary. This may also explain why Expected Change 1 and Expected Change 2 show stronger evidence than the EF self-assessments.

I also suspect students appeared to get “worse” on the EF post-assessment because they grew in self-awareness, not because their actual skills declined. A student who rated task initiation 3 out of 4 in October and 2 out of 4 in May likely did not become worse at starting tasks; over the course of the year, explicit instruction in identifying and reflecting on executive functioning probably gave that student a more accurate sense of what task initiation actually requires. According to Dunning et al., 2003 research on metacognitive development, increased self-awareness can temporarily lower self-ratings as learners develop a more realistic picture of the skill being measured.

Secondly, the highlight-coding system I used for Second Step worksheets undercounts the real value of these lessons. Lessons like 17 earned only an Approaching rating on my rubric (see Appendix) because that measure was based on a few written sentences, but it did not capture roleplaying scenarios that students engaged in during the lesson itself. From my perspective as the facilitator, class conversations prompted by the lesson were the most valuable part of Second Step. One student quoted above reference how, following a fight with her sister, she "just did the STEP thing and retraced it and then I just let go of it." This is evidence that a strategy introduced months earlier in a Second Step lesson became a reference point for her to resolve an argument outside of school.

Reflecting on the lessons themselves may also help explain why Second Step received lower enjoyment ratings than Mindful Music Moments in the post-assessment (Figure 13). Some of the content and worksheets felt repetitive and tiresome to my class, even when the underlying skill practice was valuable. Filling out a worksheet during their normal snacktime was frustrating for my students! Enjoyment and engagement are not the same measure, and I suspect students rated the program lower on enjoyment while still building meaningful skills from it.

Finally, I will reflect on my implementation. As a first-year teacher, I often chose to prioritize students' immediate academic work over my own intervention project when the two competed for time. This inconsistency likely affected the strength and clarity of my results, and a more experienced version of me would likely produce more consistent data. I also combined mindfulness practice and Second Step skill practice as two halves of one unit, but I did not build a natural bridge between them. Five of ten interview participants named this gap, distinguishing between the two components and expressing a clear preference for the mindfulness practices, as reflected in June's and Zora's comments and in the enjoyment ratings shown in Figure 13. In

hindsight, I could have done a better job explicitly teaching students how mindfulness and the Second Step skills connect to and reinforce each other.

I also believe the timing of the body systems unit limited how much it supported the intervention. We learned about the digestive, nervous, and respiratory systems at the start of the year, but I did not begin the mindfulness intervention until April. The vocabulary from that unit was not reinforced consistently in the months between. Although referenced occasionally, this may explain why students drew on it less than I expected during their post-assessments.

Implications for School-Based Mindfulness Practice

One important implication of this study is understanding what a school-based mindfulness intervention can realistically be expected to do. The FFMQ-15 measures mindful awareness across all areas of daily life, including whether a person notices sensory details in everyday moments or maintains non-judgmental awareness throughout their day. This is a much broader goal than what a classroom-based intervention is designed to achieve, and the modest overall FFMQ-15 gains in this study reflect that. I do not believe this intervention made my students more mindful people in a general, day-to-day sense.

What this intervention did do is give students specific strategies, a vocabulary for talking about how their bodies and minds work, and regular practice using those tools in a calm and supported environment. This is a meaningful outcome. In end-of-year interviews, students described reaching for these strategies in conflicts and in moments of anxiety at home. The immediacy and confidence with which students described those moments suggests the strategies had become intrinsic tools.

A related implication is the value of practicing strategies in calm moments so that they are accessible when needed. Mindful Music Moments worked in part because it gave students

regular, low-stakes practice during quiet time, when they were not in crisis. The research reviewed in this paper supports this approach (Ritter & Alvarez, 2020; Zelazo & Carlson, 2020): brief, consistent embedded practice builds more durable regulatory habits than occasional intensive sessions. One of my main takeaways is to always prioritize consistency and routine.

Limitations

This study has several important limitations that must be acknowledged. Most significantly, the intervention was implemented with 16 students in a single classroom over one school year. The small sample size limits its generalizability, and the absence of a comparison group means that observed changes in FFMQ-15 scores, EF self-ratings, or survey responses cannot be attributed exclusively to the intervention. Developmental maturation, other classroom experiences, and home environment are all contributors to the patterns observed. Furthermore, the interview component of my data collection was opt-in, which means that students interviewed either enjoyed the intervention or wanted to make me happy. Either way, it was not a random selection.

Looking Forward

Despite these limitations, there are findings I feel confident about. Students developed real vocabulary around self-regulation and executive functioning, and were able to use that vocabulary to describe their own experiences. They identified strategies that work for them and used those strategies independently. Ninety-three percent of students said they would choose to continue Mindful Music Moments next year, so I applied for a grant to fund school-wide subscription. If accepted, I will use my study and findings to guide my colleagues in adopting MMM as a self-regulatory tool school-wide. I would also love to incorporate peer-teaching roles for students who arrive with stronger baseline self-regulation skills.

“Zones of Regulation” is another program I hope to explore. It may complement this work, and its continuation would build on what the third-grade teachers at my school have already established with my upcoming group of students. My school is not currently subscribed to Second Step, so I will not have access to that specific curriculum next year. I do, however, plan to carry forward its general approach of posing scenarios, roleplaying, and discussing possible outcomes with my incoming class, along with teaching explicit skills such as using “I statements” and perspective-taking, even without the branded materials.

Above all, I have learned that explicit instruction and routine are the most important parts of teaching this kind of skill. The practices that worked best, like Mindful Music Moments, worked because they were clear and consistent, not because of any single lesson. Going forward, I am committed to keeping both mindfulness and metacognitive reflection around mindfulness as a part of my teaching practice. Students who find the classroom emotionally or cognitively demanding deserve ongoing support and a shared language for understanding their own experience. I am certain that I will continue to develop and refine this work as my understanding of what supports executive functioning development continues to grow.

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Appendix

Appendix

Template for [Revised Design](#) & Sequence

Data

Data A1: Pre & Post Intervention [Raw Data for EF Skills and FFMQ-15](#)

Data A2: [Findings Charts](#) (compiled by Claude AI)

Data A3: End-of-Year Student [Interview notes](#)

Data A4: [Post-Assessment](#) Google Form and [Responses](#)

Kindness 101 [resource](#): Steve Hartman's "On the Road"

Mindful Music Moments

Access through The Well [website](#) (requires subscription to access).

Impact & Data [here](#).

Second Step

Digital Curriculum: see [website](#) (requires subscription to access).

Mind Yeti abridged free access on Youtube [here](#).

Figure B1: Second Step Unit Outline

Unit 1: Growth Mindset & Goal-Setting 5 lessons per grade Students learn how to develop a growth mindset and apply research-based goal-setting strategies to their social and academic lives. This unit's content helps create classrooms that are connected and encouraging by helping students set and achieve collective and personal goals and learn from challenges and mistakes.
Unit 2: Emotion Management 5 lessons per grade Students learn how to build their emotion vocabularies, practice identifying their own and others' emotions, and recognize the importance of labeling and processing their emotions. This unit's content helps students understand and explore how past experiences as well as unique perspectives influence how they feel and respond to situations.
Unit 3: Empathy & Kindness 5 lessons per grade Students learn how to recognize kindness and act kindly toward others and how to develop empathy by learning strategies to take others' perspectives. This unit's content helps students understand others' points of view.
Unit 4: Problem-Solving 5 lessons per grade Students learn how to process strong emotions, describe a problem, identify the wants and needs of others, think of and explore the outcomes of potential solutions, and pick the best solution. This unit's content helps students ask, listen, and empathize with all parties involved during problem-solving.

Table B2: Second Step [student worksheets](#) and Highlight Code Rubric

Expected Change	Highlight Color	Looking for...
EC1 — Explain Key Terms	Yellow	Students name, define, or use target vocabulary and relate it to their own experience.
EC2 — Use a Strategy Toolbox	Orange	Students actively apply a taught strategy to self-regulate, communicate, focus, or solve a problem.
EC3 — Demonstrate Mindfulness	Blue	Students show evidence tied to one of the five FFMQ-15 facets: Observing, Describing, Acting with Awareness, Non-judgement, or Non-reactivity.

	Beginning	Approaching	Desired Practice	Exceeding
EC1 Key Terms	No use OR misuse of target vocabulary; no	Vocabulary appears correctly but only	Student names and explains a term	Student spontaneously labels

	personal connection made.	embedded within another response (implicit); little elaboration.	accurately AND ties to a specific personal experience or feeling.	or names a concept without being prompted
EC2 Strategy Use	Strategy not attempted OR misapplied	Strategy applied but generic/ one-sided	Strategy applied fully and correctly, considering multiple perspectives, with some personal transfer.	Strategy used fluently... multiple components integrated in one response, or transferred to a new, unprompted situation.
EC3 Mindfulness	No evidence of mindfulness practice; the activity does not require or elicit it.	Activity structures a pause or neutral framing (e.g., a “stop and think” step) but does not name or teach a mindfulness skill.	Student explicitly names or practices a mindfulness skill	Student independently applies a mindfulness skill to regulate in a real, unprompted situation, and can describe the experience.

EC3 note: no Second Step lesson analyzed produced evidence above Beginning. The curriculum does not explicitly teach mindfulness.

FFMQ-15 [Questionnaire](#) and [Scoring/ Interpretation for Students](#) (teacher-created)

FFMQ-15 Questionnaire taken from [this](#) website (NovoPsych). Developer Reference:
 Baer, R. A., Carmody, J., & Hunsinger, M. (2012). Weekly change in mindfulness and perceived stress in a mindfulness-based stress reduction program. *Journal of Clinical Psychology*, 68(7), 755–765. <https://doi.org/10.1002/jclp.21865>

EF Skills Rubric [Questionnaire](#)

Criteria	Not Yet	Almost	Yes!
Time Management	I rarely complete assignments on time and struggle to figure out which tasks must be completed first.	I sometimes manage my time effectively, and I occasionally have difficulty organizing tasks.	I consistently manage my time well, and I can effectively organize tasks.

Organization	I frequently lose materials and assignments. I have also noticed that my workspace is very cluttered.	I occasionally misplace items, and my workspace is sometimes disorganized.	I keep materials and assignments neatly organized, and I can maintain a clean and structured workspace.
Task Initiation	I put assignments off until the last minute, and I need help to start tasks	I sometimes delay starting tasks, but I can begin with a little support from an adult.	I independently start tasks promptly, and I am self-motivated.
Working Memory	I frequently forget directions that include a lot of steps, and I struggle to remember important details.	I sometimes remember instructions with reminders, and I can recall the most important information.	I consistently remember and follow multi-step instructions in addition to retaining key information.
Emotional Regulation	I become easily frustrated, and I have a difficult time managing emotions during challenging tasks or interactions with other students.	I sometimes manage emotions with support from other adults, but I have occasional emotional outbursts during challenging tasks or interactions with other students.	I demonstrate a calm and positive approach to challenging tasks, and I manage emotions effectively.
Goal Setting	I rarely set goals or break down complicated tasks.	I sometimes set basic goals with guidance from an adult.	I independently set clear, achievable goals and break down complex tasks into smaller steps.
Self-Control	I forget to raise my hand, occasionally interrupt or call out, and sometimes make unrelated comments.	I usually raise my hand, rarely interrupt or call out, and rarely share unrelated comments or stories.	I consistently raise my hand, do not call out, interrupt, or share unrelated comments or stories.

Rubrics to Analyze Desired Practice:

Desired Practice: I provide frequent and intentional "brain breaks" for the whole class.					
Element of Desired Practice	Beginning Limited	Approaching desired practice	Desired practice	Exceeding the practice	Inference; Illustrative Evidence

	evidence. Demonstrate s attempts at the practice; practice is emerging.	Partial evidence. Demonstrates the practice with some success.	Clear evidence. Demonstrates the practice regularly with success	Clear & convincing evidence. Demonstrates the practice consistently and with fluidity.	
Mindfulness practices are consistent & embedded within daily routines. (Ritter & Alvarez, 2020; Flook et al., 2010)					
Brain breaks are explicitly connected to EF skills (e.g., inhibition, working memory, cognitive flexibility. (Zelazo & Carlson, 2020; Zelazo, 2015)					
Brain breaks are responsive to student need. (Diamond, 2013; Cumming et al., 2023)					

Desired Practice: students use strategies to self-regulate.					
Element of Desired Practice	Beginning Limited evidence. Demonstrate s attempts at the practice; practice is emerging.	Approaching desired practice Partial evidence. Demonstrates the practice with some success.	Desired practice Clear evidence. Demonstrates the practice regularly with success	Exceeding the practice Clear & convincing evidence. Demonstrates the practice consistently and with fluidity.	Inference; Illustrative Evidence
Students demonstrate					

inhibitory control/ pause before acting. (Zelazo & Carlson, 2012; Spiegel et al., 2021)					
Students use mindfulness strategies when stressed. (Ritter & Alvarez, 2020; Flook et al., 2010)					
Students persist during tasks. (Spiegel et al., 2021; Dawson & Guare, 2009)					

Desired Practice: students can explain why strategies help them.					
Element of Desired Practice	Beginning Limited evidence. Demonstrates attempts at the practice; practice is emerging.	Approaching desired practice Partial evidence. Demonstrates the practice with some success.	Desired practice Clear evidence. Demonstrates the practice regularly with success	Exceeding the practice Clear & convincing evidence. Demonstrates the practice consistently and with fluidity.	Inference; Illustrative Evidence
Students use key terms & accurate vocabulary. (Zelazo, 2015; Zelazo & Carlson, 2020)					
Students reflect on how strategies influence their thinking and behavior. (Zelazo, 2016)					
Students transfer strategies (eg. academic and social). (Ritter & Alvarez, 2020; Shelach Inbar et al., 2025)					

